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A National Environmental/Energy Workforce Assessment. Alabama

National Field Research Center, Inc, Iowa City, Iowa

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A National Environmental/Energy Workforce Assessment

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16. ABSTRACT

This study is one of 70 volumes assessing the workforce needs (manpower needs) for pollution control and abatement in the United States for the five-year period of 1976 through 1981. Seven fields for pollution control — air, noise, pesticides, potable water, radiation, solid waste, and wastewater — are analyzed, together with energy-related programs currently accentuated by the national effort to solve energy supply problems.

Designed as Phase I of a three-phase program, the complete assessment includes the following volumes: one each for the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands; one for each of the ten EPA regions; a one-volume National Abstract; a volume on National Legislation; a volume on Business and Industry; and a four-volume National Summary. The information was gathered through extensive personal interviews with responsible federal, state, and local officials in every state; with officials of representative private industrial and commercial firms; and with representatives of national industrial and trade organizations.

Phase II will develop a broad national inventory of the entire range of post-secondary and higher education training offered in the pollution control and energy areas cited above, and Phase III will offer demonstrations for curriculum changes or modifications which appear necessary to assure an adequate and properly trained national environmental/energy workforce.

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WORKFORCE ASSESSMENT

for

ALABAMA

Conducted by:

NATIONAL FIELD RESEARCH CENTER, INC

Under Grant from:

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

Grant #T900591010
1977

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PREFACE

This report presents existing workforce levels, training programs, and career potentials and develops staffing level projections (1976-1982) based on available information for the State of Alabama in the environmental pollution control areas of air, noise, potable water, pesticides, radiation, solid waste, wastewater, and energy. This study was carried out for the United States Environmental Protection Agency by National Field Research Center, Inc., of Iowa City, Iowa.

The information and data presented in this report were compiled in large part from extensive interviews with professionals working in respective areas and were supplemented by telephone surveys and research.

FOREWORD

The material included herein contains the information and data collected for eight individual pollution control inventories conducted for Alabama. The format includes workforce profiles, projections, growth and career potential for each of the areas investigated. Growth projections are necessarily best professional estimates developed from available information and represent what are felt to be realistic figures by experts in the respective areas. The pollution areas considered by this study are as follows:

Air
Noise
Pesticides
Potable Water
Radiation
Solid Waste
Waste Water
Energy

National Environmental Energy Workforce Assessment

Phase I

ALABAMA

State Summary

I. AIR

The Alabama Air Pollution Control Commission is responsible for implementing the Air Pollution Control Act of 1971. The Commission's technical staff is the Division of Air Pollution Control in the Department of Public Health. There are also four local air pollution control programs in the state.

The State air pollution agency employs 45 permanent full-time employees, supplemented by the efforts of two federal assignees, one co-op student and 13 part-time employees. Professional positions include engineers, statisticians, and pollution control specialists. This Division does not anticipate that a staffing increase will occur unless amendments to the Federal Clean Air Act are enacted, in which case an estimated 20 additional persons might be required. Local programs currently contain a combined total of 43.1 person-years for air pollution control. This figure is expected to increase to approximately 57 over the next five years.

The Tennessee Valley Authority's air pollution control staff, a part of the agency's Division of Environmental Planning, is located in Muscle Shoals, Alabama. This program employs 168 people, and is expected to increase to approximately 193 over the next five years.

Sources estimate that each of the state's 816 major industrial polluters employs at least one person for air pollution control, and that there are approximately 100 consultants servicing the field. It thus appears that in excess of 1,000 persons in the public and private sector work in the field. Most of the workforce growth is expected to be in the private sector.

II. NOISE

The State of Alabama currently does not have a noise pollution control and abatement program and there is no clear indication at the present time whether or not enabling legislation for a program will be passed within the next five year period. One person in the Department of Public Health spends less than 10% of his time as the state's official noise contact, answering public inquiries and assisting universities, county health departments and other groups with noise problems, maintaining files and making minor noise measurements. The only legal authorities relate to motor vehicles and public nuisances.

According to available information, six Alabama communities have some type of noise control ordinance in effect. The most common type of ordinance is the nuisance variety which usually includes no acoustical criteria.

Surface mining operations in the northern part of the state instigate citizen complaints due to blasting activities. Sources believe this situation could provide impetus for the passage of noise control legislation. Federal support could also provide such an impetus.

Most industries in the state do not employ noise engineers or specialists, but utilize safety engineers that as a part-time function may deal with environmental noise. Sources in the field indicate that the growth prospect for careers in environmental noise control is not good unless federal initiatives compel the legislature to pass enabling legislation.

III. PESTICIDES

The Division of Agricultural Chemistry, a part of the Alabama Department of Agriculture and Industries, holds chief responsibilities for the state's pesticide program, and carries out applicator certification, pesticide registration and enforcement of applicable laws. Eight inspectors are employed, as well as twelve persons (chiefly chemists and laboratory aides) in the Division's analytical laboratory. Officials assert that a strong need exists for additional inspectors, and an additional 20 are projected to be required by 1982.

The Environmental Health Administration employs an entomologist who works on public health vectors, such as mosquito and rat control. Officials estimate that there are approximately 400 communities in Alabama that have vector control programs, and each program has at least one person who uses pesticides.

There are 146 custom applicators and 275 supervisors currently operating in Alabama. Approximately 16,000 permitted private applicators are allowed to use restricted-use pesticides. There are also 434 licensed pesticide dealers. The number of custom applicators, including supervisors, is expected to annually increase by 2 to 3% by 1982, while the number of dealers is expected to remain constant.

Training to custom applicators and dealers is provided by the Cooperative Extension Service at Auburn University. The Extension Service utilizes 7 extension specialists for this purpose.

IV. POTABLE WATER

Alabama's potable water program is carried out by the Division of Public Water Supplies in the Alabama Department of Public Health. The Division has expressed an intent to assume primacy for the Federal Safe Drinking Water Act, but state legislation will require revisions.

Including the Water Well Standards Board, the Division has a staff of 15 full-time personnel, including 7 civil engineers and 3 environmentalists. The Department's Division of Laboratories analyzes water supplies and employs 15 personnel, including 7 scientists, 2 technicians, 2 laboratory aides and 3 secretaries. In order to carry out all required responsibilities of the Safe Drinking Water Act, the Division of Public Water Supplies would need to hire an estimated 16 additional personnel, engineers and environmentalists.

Alabama has implemented a mandatory certification program since 1971 for operators of water treatment plants and distribution systems. There are currently 1,098 certificates issued to operators of plants and systems. Alabama has a Water Treatment Training Program conducted by the State Department of Education. Specialized courses in the field are also offered by the Department across the state in the field of water treatment. The Alabama Section of the American Water Works Association also offers seminars for operators. In addition, the Alabama Water and Pollution Control Association conducts an annual short course for operators. Examinations for certification are prepared by the Division of Public Water Supply.

V. RADIATION

The Division of Radiological Health of the Alabama Department of Public Health carries out the state's radiological health program. The program carries out radioactive materials licensing and inspections, radiation-emitting machine registration and inspection, environmental monitoring, and emergency response procedures. A radiation bill will be submitted to the Alabama General Assembly. If passed, this bill will allow the Division to acquire additional monies to hire needed personnel for the medical and dental X-ray program. The Division currently has a staff of 7: 3 radiation physicists, 1 technician, a director and a secretary. If the new legislation is passed, this number could double, and additional radiation physicists and technicians would be hired.

The Bureau of Environmental Health in the Jefferson County Department of Health operates the state's only local radiation program. This program employs 2 persons: a public health physicist and a radiological health inspector. This staff may double within one year, adding an additional public health physicist and an additional inspector.

State officials have expressed needs for the development of short courses, including the following: inspecting and regulating radiation-producing materials and equipment, inspecting and regulating radiation problems in phosphate mines, and the fundamentals of environmental health.

VI. SOLID WASTE

The Division of Solid Waste Management and Vector Control of the Alabama Department of Public Health is responsible for carrying out the state's solid waste program. The program is based on a cooperative arrangement with approximately 200 local county environmental officials. A new hazardous waste management bill has been drafted to be compatible with the Federal Resource Conservation and Recovery Act of 1976. The Division is currently staffed with four persons. The new legislation could double or triple this number by 1982, and those persons recruited would include chemical engineers, environmentalists and clerical personnel. A chief activity will be the development of a comprehensive system to regulate hazardous waste disposal activities in the state.

The total regulatory workforce for solid waste is estimated to be 250, including state and county employees. The local programs are not anticipated to have a considerable increase in staff over the next five years.

State sources are optimistic that the hazardous waste bill will become law during 1977. The response of private industry to the bill has been very favorable, and officials project that the new program may cause industry to have increasing workforce needs in the field of hazardous waste management and disposal.

VII. WASTEWATER

The Alabama Water Improvement Commission exercises principal program responsibility for Alabama's wastewater pollution control and abatement activities. The staff of the Commission is comprised of 63 persons and 19 vacant positions, for which there are currently no funds to support. Of the 63 positions, 41 are filled with professionals and 22 are filled with clerical and temporary personnel. Because of state budget restrictions, growth is not expected to be dramatic. The bulk of positions gained during the next five years will likely stem from the filling of the currently-vacant positions. Recruitment emphasis will likely be placed upon hiring engineers and biologists. Currently employed are engineers, scientists and technicians.

The state requires that operators of waste water treatment plants be certified. There are currently 654 certificates issued to operators. The total number of operators is expected to increase approximately 10% annually, although the number of Grade I operators is expected to decline, as many primary plants will be phased out.

Operator training is conducted during an annual Short Course School sponsored by the Alabama Water and Pollution Control Association. Instruction is also given across the state by the State Department of Education's Post-Secondary and Continuing Education Division. During Fiscal Year 1976, 705 students took part in this program.

VIII. ENERGY

The Energy Management Board and the Energy Advisory Council are the two state bodies concerned with energy-related matters in Alabama. The Council was established to assess demand trends and supply potential for all forms of energy and to reconcile environmental matters associated with energy source developments and production. Activities of the Board include fuel allocation, natural gas supply and energy conservation. The Council has twelve members, while the Energy Management Board has seven members. The Board also has a staff director, three clerks and a secretary. By 1982, the director hopes to obtain an additional seven positions, including engineers, a statistician and an economist.

Alabama Power Company's Division of Environmental and Technical Services employs 32 persons, including engineers, chemists, biologists, and other personnel. The future growth or decline of this staffing level will in large part be contingent upon federal and state legislation and directives.

The Tennessee Valley Authority's radiological hygiene and air quality programs are located in Muscle Shoals, Alabama. These programs employ a total of 234 persons. This number is projected to increase, particularly for radiological hygiene.

The most active growth in the energy field will probably be in the coal and nuclear areas. Engineers and scientists with backgrounds in these fields should have the best career potentials.

STATE OF ALABAMA - SUMMARY

National Environmental/Energy Workforce Assessment
Pollution Control & Abatement Personnel
Projected Workforce Requirements (1976-1981)

Environmental Area	1976	1977	1978	1979	1980	1981	%/annum growth (average)
AIR[1]	256	268	283	297	305	315	4%
NOISE[2]	1	1	1	1	1	1	0%
PESTICIDES[3]	1,283	1,299	1,316	1,334	1,352	1,371	1%
POTABLE WATER[4]	30	32	35	39	43	46	9%
RADIATION[5]	9	13	18	18	18	18	16%
SOLID WASTE[6]	250	253	256	259	262	265	1%
WASTEWATER[7]	717	741	764	786	817	826	3%
ENERGY[8]	5	7	9	10	11	12	20%
TOTALS	2,551	2,614	2,682	2,744	2,809	2,854	2%

[1] Includes the state agency and assumes passage of amendments to the Clean Air Act, local programs and TVA's air staff in Muscle Shoals. There are approximately 900 persons in the private sector in the field; this number is expected to grow.

[2] Represents 1 person in the Department of Public Health. If noise legislation is passed, workforces would increase in the public and private sectors.

[3] Includes the state agency (1976=20;1981=40), the Extension Service, municipal vector control programs, custom applicators, supervisors and dealers. Does not include approximately 16,000 private applicators.

[4] Includes the state agency, based upon assumption that primacy will be achieved. There are 1,098 certificates issued to operators of treatment plants and distribution systems.

[5] Includes the state and local programs, and assumes passage of the state radiological health bill.

[6] Includes the state and local agencies.

[7] Includes the state agency (1976=63;1981=90) and certified wastewater plant operators.

[8] Includes staff members of the Alabama Energy Management Board.

EDUCATION

Environmental/energy curricula are available in several forms in Alabama. Auburn University's School of Engineering offers in its Chemical Engineering and Civil Engineering Departments courses in environmental fields. In the Biology Department of Auburn University at Montgomery, two environmental options are offered: Environmental Studies and Environmental Technology.

An Environmental Science Certificate Program is offered at the University of Alabama at Huntsville, which is a supplement to an academic degree. Bachelor-level degrees in Mineral Engineering and Civil Engineering (with environmental coursework) are offered at the University of Alabama. Master's degrees in Mineral Engineering and Environmental Engineering are also offered.

The Civil Engineering Department at the University of Southern Alabama offers courses in air, water supply, wastewater and solid waste. A master's degree in Environmental Sciences is offered by the Tuskeegee Institute. In addition, Alabama A & M University offers a B.S. degree in Environmental Science designed to prepare students for graduate study or technician-level environmental employment.

A two-year environmentally-related curriculum is available at the Southern Union State Junior College. Offered is an Associate in Applied Science Degree in Aquatic Technology.

LEGISLATION

The environmental/energy legislation for Alabama was obtained by request from various agency personnel and through various library references. Summaries of the legislation deemed most relevant to the eight subject areas of the workforce assessment were prepared, and are included in the respective state reports. The following list of laws represents virtually all environmental legislation for the state. Only certain of the following laws were summarized; the list is presented to show, by title, the kinds of laws which have been enacted.

Air Pollution Control Act of 1971

Custom Application of Pesticides Act

Pesticide Act of 1971

Public Water Supply Systems and Waste Water Treatment Plants Law

Radiation Control Act

Hazardous Wastes Management Act of 1976

Solid Wastes Disposal Act

Solid Waste Financing Act

Water Improvement Commission Act

Surface Mining Reclamation Act of 1975

National Environmental Energy Workforce Assessment

Phase I

ALABAMA

State Report

STATE PROFILE

Alabama ranks twenty-first in population and twenty-eighth in land area in the United States. The state is the leading heavy industry state in the South and Birmingham is often referred to as the "Pittsburgh of the South". Birmingham lists iron, steel and textiles among its major manufactures. The Tennessee River Valley area is also a rapidly growing industrial area. The Tennessee Valley Authority (TVA) operates a huge Muscle Shoals Power Plant in the northern section of the state. Other major products of Alabama include cement, feeds, fertilizer, chemicals, rubber, and aluminum products. The state is also a major producer of cotton, poultry, cattle, hogs, corn, potatoes, peanuts and fruit.

Mr. R.C. Banberg, the Director of the State Development Office, was quoted in the Atlanta Journal and Constitution (1-9-1977) as stating, "When all the figures are in, I am confident that 1976 will equal or exceed the record year of 1975 in industrial growth. We have averaged about $1 billion a year in the past six years in industrial growth and we expect to reach that mark in 1976. The best economic indicator is the fact that existing plants are expanding. This clearly indicates that our industrial climate is healthy."

ALABAMA POLLUTION CONTROL AND ABATEMENT AGENCIES

The Alabama Department of Public Health is the principal state environmental agency. This Department has primary responsibility for the air, potable water, radiation, solid waste and wastewater programs. Additional state agencies or organizations concerned with environmental protection include the Alabama Energy Management Board and the Department of Agriculture and Industries (pesticides).

In the Department of Public Health, the pollution control activities are principally located in the Environmental Health Administration. The Alabama Water Improvement Commission and the Air Pollution Control Commission are quasi-independent of the Environmental Health Administration. The Administration has six divisions: the Division of General Sanitation, Division of Inspection, the Division of Public Water Supplies, the Division of Laboratories, the Division of Radiological Health and the Division of Solid Waste and Vector Control.

The Water Improvement Commission has responsibility for the wastewater pollution control program. The Air Pollution Control Commission is responsible for the assurance and maintenance of ambient air quality in Alabama.

The Environmental Health Administration handles public relations, coordination with other divisions and provides an overall direction to the program policies of the divisions. The General Sanitation Division utilizes personnel of county health departments to assist it in enforcement matters as does the Food Inspection Division. Personnel of both divisions are paid by county funds. The Division of Laboratories conducts chemical analyses of environmental samples collected by the Administration's other divisions. Including the personnel of both commissions, the Environmental Health Administration has a total professional and technical staff of over 150.

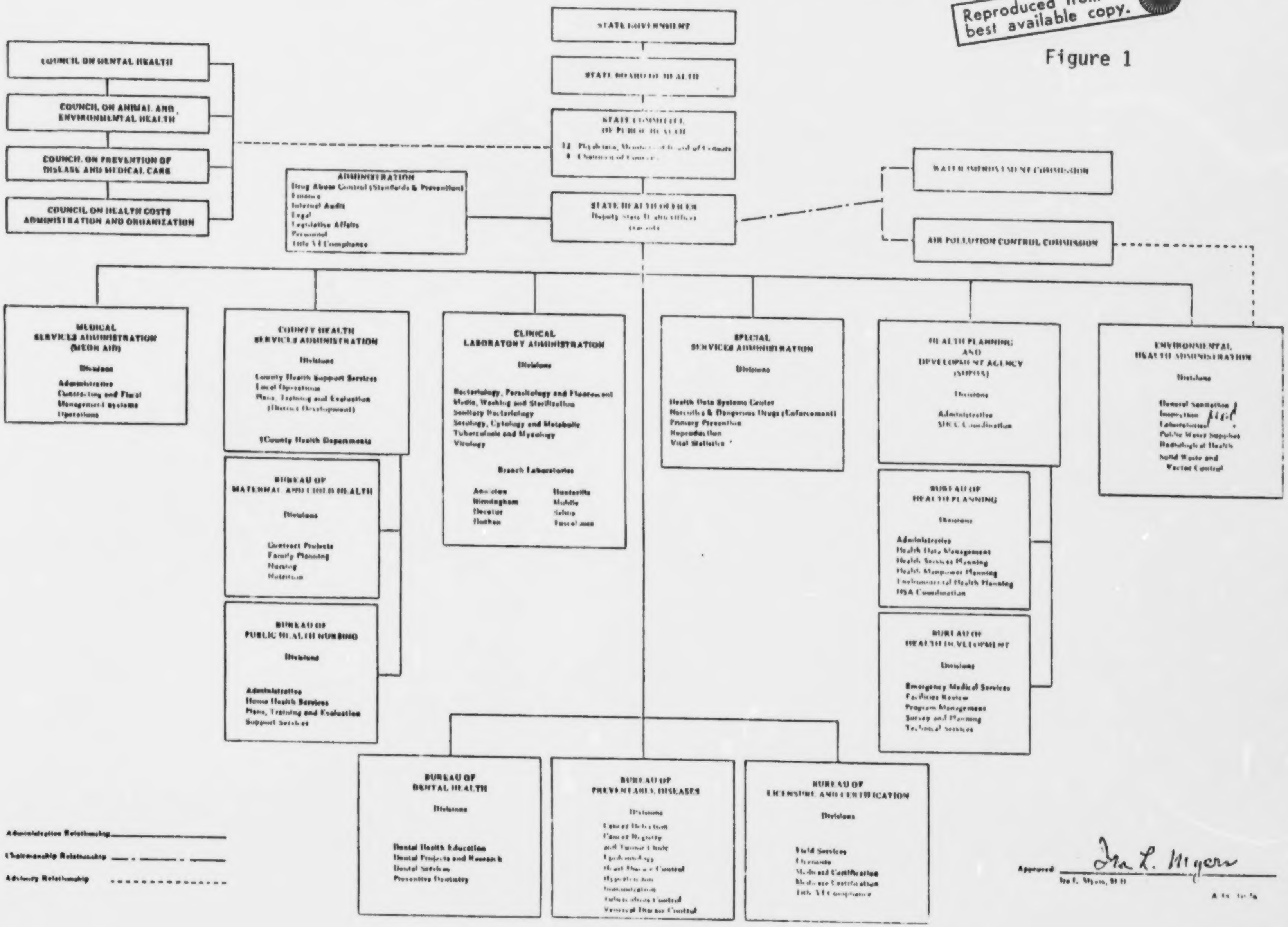
The state lead agency for the pesticide applicator certification program is the Department of Agriculture and Industries. The Department's Division of Agricultural Chemistry is responsible for regulating restricted use of pesticides in the State of Alabama.

The state's principal energy planning agency is the Alabama Energy Management Board. The Alabama Advisory Council was established by the Alabama Governor to reconcile environmental quality requirements with Alabama's energy needs and to advise the Governor of future policy initiatives which need to be taken.

ORGANIZATION OF THE ALABAMA DEPARTMENT OF PUBLIC HEALTH

Reproduced from best available copy.

Figure 1


STATE GOVERNMENT
STATE BOARD OF HEALTH
STATE COMMITTEE OF PUBLIC HEALTH
12 Physicians, Members of Board of Censors
4 Chairmen of Councils
STATE HEALTH OFFICER
Deputy State Health Officer
COUNCIL ON MENTAL HEALTH
COUNCIL ON ANIMAL AND ENVIRONMENTAL HEALTH
COUNCIL ON PREVENTION OF DISEASE AND MEDICAL CARE
COUNCIL ON HEALTH COSTS ADMINISTRATION AND ORGANIZATION
ADMINISTRATION
Drug Abuse Control (Standards & Prevention)
Finance
Internal Audit
Legal
Legislative Affairs
Personnel
Title VI Compliance
WATER IMPROVEMENT COMMISSION
AIR POLLUTION CONTROL COMMISSION
MEDICAL SERVICES ADMINISTRATION (MEDICAID)
Divisions
Administration
Contracting and Fiscal
Management Systems
Operations
COUNTY HEALTH SERVICES ADMINISTRATION
Divisions
County Health Support Services
Local Operations
Plans, Training and Evaluation (District Development)
County Health Departments
BUREAU OF MATERNAL AND CHILD HEALTH
Divisions
Contract Projects
Family Planning
Nursing
Nutrition
BUREAU OF PUBLIC HEALTH NURSING
Divisions
Administration
Home Health Services
Plans, Training and Evaluation
Support Services
CLINICAL LABORATORY ADMINISTRATION
Divisions
Bacteriology, Parasitology and Fluorescent
Media, Washing and Sterilization
Sanitary Bacteriology
Serology, Cytology and Metabolic
Tuberculosis and Mycology
Virology
Branch Laboratories
Anniston
Birmingham
Decatur
Dothan
Huntsville
Mobile
Selma
Tuscaloosa
SPECIAL SERVICES ADMINISTRATION
Divisions
Health Data Systems Center
Narcotics & Dangerous Drugs (Enforcement)
Primary Prevention
Reproduction
Vital Statistics
HEALTH PLANNING AND DEVELOPMENT AGENCY (SHPDA)
Divisions
Administration
SHCC Coordination
BUREAU OF HEALTH PLANNING
Divisions
Administration
Health Data Management
Health Services Planning
Health Manpower Planning
Environmental Health Planning
HSA Coordination
BUREAU OF HEALTH DEVELOPMENT
Divisions
Emergency Medical Services
Facilities Review
Program Management
Survey and Planning
Technical Services
ENVIRONMENTAL HEALTH ADMINISTRATION
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Inspection
Laboratories
Public Water Supplies
Radiological Health
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Preventive Dentistry
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Divisions
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Cancer Registry and Tumor Clinic
Epidemiology
Heart Disease Control
Hypertension
Immunization
Tuberculosis Control
Venereal Disease Control
BUREAU OF LICENSURE AND CERTIFICATION
Divisions
Field Services
Licensure
Medicaid Certification
Medicare Certification
Title VI Compliance
Administrative Relationship
Chairmanship Relationship
Advisory Relationship
Approved Ira L. Myers
Ira L. Myers, M.D.

Pollution Control and Abatement Programs

I. AIR

A. Introduction

The Alabama Air Pollution Control Act of 1971 (Act 769) provides for the regulation, control, abatement and prevention of air pollution in the State of Alabama. Its basic purposes are to achieve and maintain such levels of air quality as will protect human health and safety, to prevent injury to plant and animal life and property, and to provide for a coordinated statewide program of air pollution abatement and control. This Act received national recognition at a national symposium on state environmental legislation and was selected as a national model in 1972. Considered to be one of the major strengths of the Act, an Alabama Air Pollution Control Commission (AAPCC) was also established and its powers and responsibilities were defined. The AAPCC is composed of seven members, with the State Health Officer of the Department of Public Health serving as Chairperson. The other six members are appointed by the Governor, four of whom are representative of the public. One member is to be a registered professional engineer and another a licensed physician, educated and experienced in lung and respiratory diseases.

Broad administrative and regulatory powers are delegated to the Commission along with adequate legal authority to fully implement the Act's purposes. The Commission is given the authority to adopt rules and regulations specifying ambient air quality standards for various air contaminants,to require reduction in emissions during air pollution episodes, to adopt emission limitations for sources of air pollution, and to develop a permitting system. The Commission is also authorized powers of litigation for violations of the Act through issuing orders and seeking civil penalties.

The Alabama Air Pollution Control Act authorizes the establishment of local air pollution control programs and provides the Commission with coordinating authority. The four local air pollution control programs which are either operated by county boards of health or municipalities are required by the Act to have rules and regulations at least as restrictive as those of the Commission. Their funding originates from local sources and EPA grants, thus providing broader-based funding resources to control air pollution in the State of Alabama. Their activities do not duplicate the Commission's functions and the local programs are responsible for all matters pertaining to air pollution control within their areas of jurisdiction, including the regulation of air pollution sources.

The Alabama Air Pollution Control Commission will increasingly focus its activities on assuring that sources of air pollution remain in compliance, completing non-attainment/maintenance analyses, continuing coordinated activities with EPA and continuing and improving the new source review program. Although the original State Implementation Plan and federal regulations required that minimum ambient air quality standards be attained by May 31, 1975, it was evident that a number of areas were experiencing difficulties in achieving compliance. Metropolitan Birmingham has been designated as a non-attainment area of the National Ambient Air Quality Standards and the U.S. Environmental Protection Agency has called for the Air Quality Control Region to revise its State Implementation Plan for attainment and maintenance of total suspended particulate standards. The Birmingham area also has not attained standards for emissions of carbon monoxide and oxides, but no call for revisions in the State Implementation Plan has been made for these substances.

The Alabama Air Pollution Control Commission regulated 985 major sources in 1975, which is 59 percent more than the average for the Southeastern (Region IV) states. Jefferson County, which contains Birmingham, is the area in Alabama with the highest particulate levels and this area has achieved a 61 percent reduction between 1973 and 1976. To compound the problem, Jefferson County often experiences heavy temperature inversions which cause particulates to remain over the city for extended periods of time. The Commission is conduction atmospheric and modeling studies concerning possible increases of pollutants in the State so as to determine the scope of the problem.

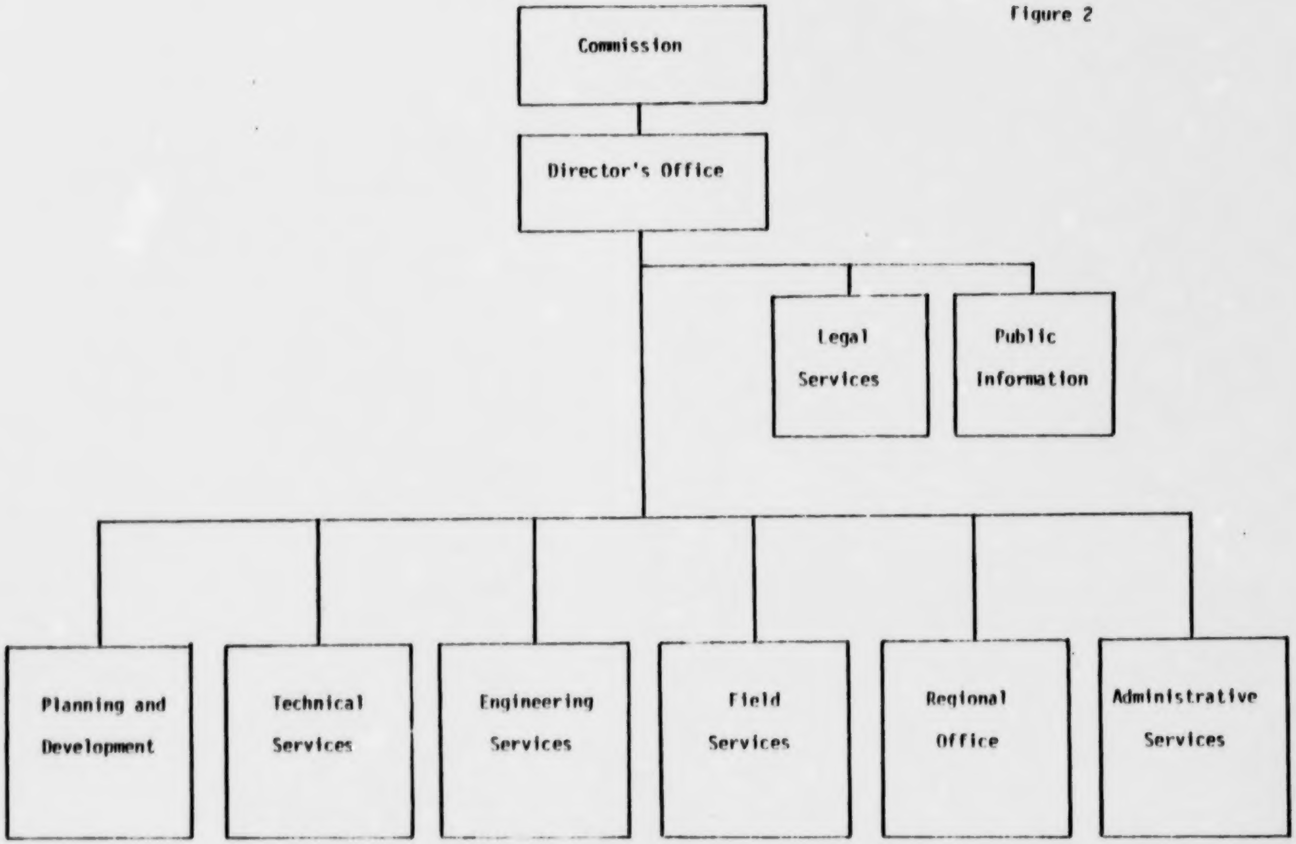
B. Workforce Profile

The Division of Air Pollution Control is the Commission's technical staff, located within the Department of Public Health. The Alabama Air Pollution Control Act is implemented through this Division, and the Commission is empowered to appoint a director to head the Division. The Division of Air Pollution Control has four basic duties:

1) Achieving ambient air quality standards through the reduction of emissions;
2) Maintaining ambient air quality standards, and monitoring levels of air contaminants existing throughout Alabama;
3) Responding to citizen complaints pertaining to emissions of air contaminants;
4) Coordinating with the federal government to the extent required by the Clean Air Act.

ALABAMA AIR POLLUTION CONTROL COMMISSION

Figure 2


Commission
Director's Office
Legal Services
Public Information
Planning and Development
Technical Services
Engineering Services
Field Services
Regional Office
Administrative Services

The four local air pollution control programs, along with the Division of Air Pollution Control, provide a coordinated and complementary effort to facilitate the control of air pollution in the State. These programs are administered by the following:

1) Jefferson County Department of Health
2) Mobile County Board of Health
3) Tri-Counties District Health Services
4) City of Huntsville

The Division of Air Pollution Control is divided into six sections: a Planning and Development Section, a Technical Services Section, an Engineering Services Section, an Administrative Services Section, a Field Services Section and a Regional Office.

A total of 45 persons are employed on a full-time basis with the Division of Air Pollution Control at the present time (1976). Assistance is provided for their activities by two federal assignees, two co-op students and 13 part-time employees, who each work several hours per week for an equivalent of two person-years. The Division operates from its central office in Montgomery and a regional office in Decatur which is staffed with three persons. The four local air pollution control programs have relieved the Commission of establishing a greater number of field offices since local programs are capable of performing the same tasks.

Most of the technical engineering staff of the Division of Air Pollution Control are classified under the State Merit System as Public Health Engineers. Entry level candidates for a Public Health Engineer position must be a university or college graduate in engineering. The Division also employs ten pollution control specialists to perform such tasks as collecting samples for laboratory analysis, setting up procedures for sampling, conducting a variety of laboratory tests and investigating pollution complaints. According to the position description, an entry level pollution control specialist must be a four-year college graduate with major course work in biology, chemistry, geology or environmental engineering. At the technician level, the Division employs environmental health specialists to assist in setting up, calibrating, operating, and maintaining mechanical and electronic air sampling equipment. Environmental health specialists also assist in investigating culm piles, open burning and other sources of air pollution. Graduation from high school with science and mathematics courses is required for an entry level position of this classification.

Of the 45 permanent employees of the Division of Air Pollution Control, 34 are professionals and eight are clerical. The professional positions include engineers, statisticians, a chemist, a legal research aide, an information specialist, an administrative assistant, a meteorologist and pollution control specialists. The following table depicts current workforce staffing levels for permanent personnel employed by the Division of Air Pollution Control:

TABLE I

ALABAMA AIR POLLUTION CONTROL COMMISSION

Division of Air Pollution Control
Current (1976) Staffing Level

Position	1976
Engineer	16
Meteorologist	1
Research Scientist	13
Technician	2
Other	13
TOTAL	45

The Division of Air Pollution Control receives its funding from both federal and state sources, and approximately sixty percent of its budget is derived from federal grants. The four local air pollution control programs operate in conjunction with the Division of Air Pollution Control, but they make their own requests for federal grants to EPA. The local programs are primarily responsible for all matters relating to air pollution control within their jurisdictions, including the regulation of sources.

Overall, the Division is felt to have a good working relationship with the local programs and the federal government. There is sufficient contact between the agencies to ensure a uniformly administered program with very little overlap between the various agencies' jurisdictions.

Jefferson County (Birmingham) has the largest local air pollution control program, with a staff of 18 full-time persons assigned to the Division of Air Pollution Control within the Bureau of Environmental Health. The Mobile County Board of Health's Bureau of Environmental Health has the second largest local air program in the State with a total of 12.2 person-years allocated to its air pollution control and abatement effort. Huntsville's Air Pollution Control Department staff has a total of 5.7 person-years and the Tri-County (Lawrence, Limestone, and Morgan) District Health Service Air Pollution Control Program has 7.2 person-years for its air pollution control program. Positions currently represented in these four local air pollution control programs are depicted in the following table, by person-years.

TABLE II

STATE OF ALABAMA

Local Air Pollution Control Programs
Current (1976) Staffing Level

Position	1976
Engineer	10.0
Attorney	.2
Scientist	9.9
Technician	4.0
Sanitarian	5.4
Other	13.6
TOTAL	43.1

Jefferson County local air program officials estimated that the Birmingham area has approximately one hundred industries, and each company which has its own pollution control and abatement staff may have four persons for these activities. Many companies do not have staff people designated to control their pollutants, but hire private consulting firms.

Jefferson County Division of Air Pollution Control sources estimate that Jefferson County has approximately 400 pollution control and abatement jobs; one-half are for Water Pollution Control and one-half for air pollution control. Two hundred of these four hundred pollution control and abatement personnel are employed by Southern Services, Inc., Rust Engineering, the University of Alabama in Birmingham and Jefferson

County's Division of Air Pollution Control. The positions included in this total are engineering technicians, chemists, biologists, engineers, waste water treatment plant operators, water plant operators and technician aides. For air pollution control, civil, chemical and mechanical engineers are most often utilized. Jefferson County's largest polluter employs between 75 and 100 persons in pollution control and abatement jobs, and other major polluters employ similar or slightly smaller staffs.

U.S. Pipe and Foundry Company in Birmingham is a good example of a moderate sized industry in the Birmingham area that employs pollution control and abatement engineering personnel. In the company's environmental group, five environmental engineers are employed full-time to abate pollutants in both Birmingham and Chattanooga. The head of the Environmental Engineering Section is involved in the abatement of water pollution but also works on air and OSHA aspects. Two engineers have been designated to work on air pollution control and abatement activities and one on water. One engineer works primarily on OSHA problems for the company. All of U.S. Pipe's pollution control and abatement personnel are graduate engineers. One is a civil engineer, one a chemical engineer and three are mechanical engineers. U.S. Pipe also has two engineers, one for air and one for water pollution, in Chattanooga, who install new control processes developed by the Environmental Engineering Section.

The Tennessee Valley Authority's (TVA) air pollution control personnel are based in Muscle Shoals, Alabama, and are responsible to the Air Quality Branch of the Division of Environmental Planning. The TVA Air Quality Branch coordinates the Authority's air quality management program and related activities and employs a total of 168 personnel. A large number of

TVA Air Quality Branch personnel have college backgrounds but no degrees (35) and 38 persons have had no college experience. Only one person employed by the Air Quality Branch has an associate degree. Of the Branch professionals, eight are engineers, 13 are meteorologists, 17 are chemists, and five are physicists.

In summary, the public and private sectors employ approximately 1,000 air pollution control and abatement personnel. The Commission and the local air programs employ a total of 88 air pollution control personnel, and it is estimated that each of Alabama's 816 major industrial polluters employ at least one person to work part- or full-time in controlling air pollution. These persons may be involved in the installation of continuous monitoring equipment and the design of control processes, possibly in a company's design engineering section. Many of the smaller sources of air pollutants employ private consultants. State sources estimate that there are approximately 100 consultants employed to work on air pollution control and abatement activities.

C. Workforce Projections

Workforce projections regarding the State and local air pollution abatement and control regulatory agencies are based on the judgments of professionals in the field. Of particular assistance in compiling these estimates were Mr. Jim McVay and Mr. James Cooper of the Division of Air Pollution Control in Montgomery; Mr. Paul Pate and Mr. Henry Burnett of the Jefferson County Bureau of Environmental Health; Mr. Paul Saywell of the Tricounty District Health Service Air Pollution Control Program; and Mr. James Fibbe, P.E., of the Mobile County Bureau of Environmental Health.

The Division of Air Pollution Control experiences a relatively high annual turnover rate of approximately ten percent. Most of the Division's engineering personnel are in the twenty- to thirty year age group, and are likely to be recruited by the private sector which offers higher salaries. Although entry level engineering salaries offered by both the State and private sector are comparable, once an engineer has developed an expertise working with the State in a specialized area, such as air pollution control, industry is much more willing to offer substantially higher salaries to recruit such a person.

The State's Division of Air Pollution Control currently has no plans to increase its workforce in the next five years, as it is considered unlikely that the Alabama Legislature will appropriate any additional funding for staff increases. The principal reason for such skepticism is the fact that the Legislature cut the Department of Public Health's Fiscal Year 1976 appropriations by seven percent from the 1975 level. The Division operates with a maximum of fifty permanent positions, of which 45 are currently filled. The budget of the Alabama Air Pollution Control Commission is derived from 40 percent State funds and 60 percent federal funds. As federal funds are tied to State program appropriations, and the Legislature is unwilling to increase the Health Department's budget, Division officials anticipate that they will remain at their present staffing level to 1982. However, if amendments to the Federal Clean Air Act are enacted by the U.S. Congress, the Division of Air Pollution Control may have to increase its staff by recruiting an additional 20 full-time personnel by 1982. Again, growth is dependent upon how willing the Alabama Legislature is to increase the State's funding in future budgets.

Workforce projections for the commission's Division of Air Pollution Control are depicted in the following table. They are based upon the assumption that amendments to the Clean Air Act will be passed, and the required staff will be obtained.

TABLE III
ALABAMA AIR POLLUTION CONTROL COMMISSION
Division of Air Pollution Control
Workforce Projections to 1982 (est.)*

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	16	18	20	22	24	26	6%	10%
Meteorologist	1	1	1	2	2	2	n/a	20%
Scientist	13	13	13	13	13	13	n/a	0%
Technician	2	2	2	2	2	2	n/a	0%
Other	13	14	16	18	19	20	4%	9%
TOTAL	45	48	52	57	60	63	10%	7%

*The projections are based only on the numbers of full-time permanent personnel, and do not include such personnel as federal assignees, part-time personnel and co-op students.

The four local programs are financially in the same situation as the Division of Air Pollution Control. Their budgets are made up of 40 percent local funds and 60 percent federal funds. State officials have asserted that local agencies, such as Jefferson County's Division of Air Pollution Control, have an easier time justifying the establishment of local air pollution control and abatement problems principally because the air pollution problems are highly visible. Also, public supports exists for the programs in such highly industrialized cities as Birmingham. Alabama's legislature has been requested to provide financial support to the local programs, but it has been unwilling to do so.

Jefferson County officials project a thirty percent increase in the Division of Air Pollution Control staffing level over the next five years. The total increase is only expected to amount to four positions which include an engineer, two sanitarians and one statistician/programmer. The Division's staff has only increased by two positions since 1974, and turnover has averaged four percent annually.

The Division may reorganize and shift personnel from air monitoring tasks to enforcement, and expanded surveillance and special studies may be performed which would necessitate the hiring of additional personnel. A continuous surveillance review program needs to be established and officials anticipate a need to send personnel into plants to conduct studies on the ongoing effectiveness of the air pollution control equipment.

Mobile County is experiencing a dramatic industrial and population growth rate according to local officials. Mobile County currently has a population of 350,000 and is growing by 15,000 additional people each year. The Bureau of Environmental Health currently has a total staff of 14 persons and 10.7 person-years of effort is devoted to air pollution control. The local air program is anticipated by program officials to grow annually in staff person-years by four percent. The increased staff is needed to perform new tasks such as ensuring compliance with new source performance standards, identification of hazardous pollutants, and ensuring that there is no significant deterioration in ambient air quality standards.

An additional engineering technician and a clerk are expected to be recruited by the Tri-County District Health Service Air Pollution Control

Program by 1982. Huntsville's Air Pollution Control Department has a total staff of seven persons with assistance provided by three CETA employees. One professional/technical position is expected by local officials to be recruited in either 1977 or 1978. Local officials anticipate that Huntsville's local air program will remain at a total of eight positions through 1982.

The following table depicts workforce projections for the local air pollution control programs in terms of person-years, since not all employees work full-time on air pollution control matters.

TABLE IV
STATE OF ALABAMA
Local Air Pollution Control Programs
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1931	%/annum turnover (average)	%/annum growth (average)
Engineer	10.0	11.0	13.0	14.0	15.0	16.0		10%
Attorney	.2	.2	.2	.2	.2	.2		0%
Scientist	9.9	9.9	9.9	9.9	9.9	9.9		0%
Technician	4.0	4.0	5.0	5.0	5.0	5.0		5%
Sanitarian	5.4	6.4	6.4	7.4	7.4	8.4		10%
Other	13.6	14.6	15.6	16.6	17.6	17.6		5%
TOTAL	43.1	46.1	50.1	53.1	55.1	57.1	10%	6%

In summary, neither the State nor the local air pollution abatement and control regulatory agencies are anticipated to increase significantly their staffing levels over the next five-year period. Most environmental workforce growth is expected to be in private industry over the next five to ten years, especially for surveillance and maintenance activities. Ten years ago, according to local Alabama officials, the majority of air pollution control personnel were employed in governmental service. Today, governmental agencies are stabilized in terms of staff and the majority of air pollution control engineers in Alabama are employed in the private sector by industry and consulting firms. Present staffing levels are expected to be maintained over the next two to four years in governmental regulatory agencies, as these agencies have more difficulty justifying major increases in staff because of the general economic situation. These agencies will probably remain stable until federal regulations require a modification of effort.

D. Training and Certification

The Division of Air Pollution Control relies on the EPA Air Pollution Training Institute courses for upgarding professional staff. According to the Air Pollution Training Institute's "Final Cumulative Analysis for Fiscal Year 1976", the State of Alabama sent a total of 11 students to courses at the Institute during 1976. The local air pollution control agencies sent a total of 12 persons: five from Mobile County, one from the Tri-County District Health Services and six from Jefferson County. The State Division of Air Pollution Control officials stated that they would prefer to send their personnel to the Region IV EPA courses rather than to Research Triangle Park if the Region offered more insitute courses.

The State Division of Air Pollution Control also sends three persons per year to various universities for advanced education in environmental engineering. The Commission pays salaries and tuition expenses while individuals are earning master degrees. Division personnel are also occasionally sent to selected institutions for advanced education in fields other than environmental engineering, e.g., public administration. Division sources feel that this policy may be an effective means of retraining professional employees. The Department seldom turns down legitimate requests from the Division for long-term professional enrichment programs of study. However, because of budget constraints, there is a question of how much longer the Department will be able to continue sending personnel to school for additional training.

The visible emission certification program, or "smoke school", conducted by the Division of Air Pollution Control is attended by 30 to 40 persons at each session. The sessions are offered quarterly and participants must be recertified every six months. The Alabama Air Pollution Control Commission is attempting to improve its visual emission certification program with multimedia materials such as slides and films from the EPA Air Pollution Training Institute. The present lecture portion of the program is considered by the Division officials to be inadequate and it is hoped that, with the acquisition of such materials, the program can be improved substantially.

The Jefferson County Air Pollution Control personnel are trained on the job, as well as at EPA training schools. The Division attempts to send all of its professional staff to at least one short course annually. Personnel also attend EPA Air Pollution Training Institute courses conducted at the regional office in Atlanta whenever short training courses are scheduled. Staff are also sent to state seminars on related topics such as meteorology.

Jefferson County officials would like EPA Region IV in Atlanta to conduct more engineering and enforcement courses. This area is considered by Division officials to be their primary training need and an area in which they are presently deficient. These officials suggested that it is unfortunate that Atlanta Region IV only conducts one to two courses annually. Some of the other courses offered by EPA are considered to be difficult to attend, as they are conducted in distant areas. These county officials expect that industries in Alabama will find it difficult to provide their air pollution control personnel with adequate training in order to keep very sophisticated monitoring equipment operating at peak efficiency.

E. Career Potential

As the staffing level of the State of Alabama Division of Air Pollution Control has stabilized in the past year and no future growth is anticipated in the next five years, the career potential for persons interested in employment with the state air pollution control and abatement is not very promising. If funds become available in the next few years and the Division can recruit additional personnel persons with engineering degrees will have the best potential of being hired. No new or unique careers are anticipated by Division officials to emerge in the air pollution control and abatement field in the next five years.

According to Jefferson County Bureau of Environmental Health sources, career potential for the next five-year period exists within private industry for personnel to monitor the operations of pollution control equipment. Industries' workforce needs are anticipated to become more critical in the years ahead for the performance of maintenance and surveillance tasks.

F. Conclusion

Both the State of Alabama's air pollution control and abatement programs and those of the four local agencies are not anticipated to undergo staffing increases in the next five years. The principal reason is the unavailability of funds to support such increases. The legislature is especially reluctant to provide for such increases by increasing the state tax base. A prime example of the fiscal restraints under which most Alabama state agencies operate is that the annual budget for the entire Department of Public Health was cut seven and one-half percent for Fiscal Year 1976.

The Birmingham-Jefferson County area has been designated as a non-attainment area in reducing the emissions of particulates according to federal standards and guidelines, and the problems faced in this highly concentrated industrial area are immense in controlling such emissions. The county and state have been studying alternatives for attaining necessary compliance. The Alabama Air Pollution Control Commission has been studying the Birmingham problem by making models of the area using meteorological studies and feeding ambient air quality data into a computer to find out what air quality is attainable in the city.

The Jefferson County Division of Air Pollution Control may increase thirty percent over its present staffing level during the next five years due to a need for expanded surveillance capabilities and for special studies that need to be performed. An additional public health physicist may be hired by the Bureau of Environmental Health to assist the Division of Air Pollution Control in conducting studies in the Birmingham area. The Jefferson County program may reorganize and shift personnel from air monitoring tasks to enforcement responsibilities. An air sampling station has been set up in the Birmingham area and the Bureau of Environmental Health is in the process of installing a data acquisition system. The county will soon have a means to provide better and more reliable data to determine whether any progress is being made to control Birmingham's emissions of particulates.

As it is expected that industrial plants will need more control process technicians to ensure that their pollution control equipment is functioning properly, the principal job opportunities in Jefferson County are expected to be in private industry. This situation is evidenced by the number of industries presently operating in Jefferson County which are in the final stages of making capital expenditures for pollution control instruments and equipment. Industry will also require trained personnel who can determine significant deterioration in the ambient air quality standards. As a consequence, positions will likely be available for individuals trained and educated in the sciences and engineering.

II. NOISE

A. Introduction

The State of Alabama currently does not have a noise pollution control and abatement program. According to Environmental Health Administration officials, noise control has a very low Department of Public Health priority and they feel that insufficient public sentiment exists to compel the Alabama legislature to pass noise control legislation. The state spends less than 200 dollars annually for a radiation physicist's time to serve as Alabama's principal contact for noise control matters with EPA and the citizenry. This official spends less than ten percent of his time answering public inquiries, assisting universities, county health departments and other groups with noise problems, maintaining files and making some minor noise measurements. Very little action has been taken by the State of Alabama to study noise problems and, since 1974, the only official action was to designate the principal noise contact for the state.

Complaint handling is severely limited by Department of Public Health policy. Assistance provided to individuals for literature, equipment, training and advice has been provided only on a personal service basis without using state funds. The official noise contact, Mr. Lloyd G. Lynn, Jr., is specifically prohibited from conducting field investigations and studies which require the use of travel funds. Mr. Lynn is personally interested in developing a noise control capability in the State of Alabama, but up to the present time has been unsuccessful in his efforts. As noise control and abatement is one of EPA's newest areas of involvement, Mr. Lynn would like to see an Alabama program developed so, at the very least, the state has a pollution control and abatement capability in each of EPA's program areas.

The only legal authority in existence at the present time to prosecute those who generate noise pollution is found in Title XXXVI, Section 39 of the Code of Alabama and it pertains to motor vehicles:

> S39: Mufflers; prevention of noise, smoke, etc.
> (a) Every motor vehicle shall at all times be equipped with a muffler in good working order and in constant operation to prevent excessive or unusual noise and annoying smoke, and no person shall use a muffler cut-out, bypass, a muffler without baffles, or similar device upon a motor vehicle on a highway.

According to the Chief of the Environmental Protection Division within the Alabama Attorney General's Office, Mr. Henry Caddell, the only other means to legally regulate noise problems in Alabama is by a public nuisance law which is an old common law. Mr. Caddell feels that the State of Alabama generally does not have a noise pollution problem, other than in Birmingham, primarily because the state is not as urban as other states. The Birmingham area occasionally experiences problems with industrial noise but most Alabamans live in towns of 30,000 or less.

Surface mining operations in the northern part of the state also instigate complaints from citizens of the area at times because of blasting activities. The Attorney General's Office considers the blasting activities in the northern portion of the state to be a severe noise pollution problem. Many commercial and residential property owners have been affected by this blasting and this problem may eventually provide the public support for the legislature in finally adopting laws to create a noise pollution control and abatement program.

B. Workforce Profile

The State of Alabama has no one designated full-time to work on noise pollution and abatement problems. Alabama has no legislative authority or budget for the employment of any personnel for noise control activities. Dr. Charles E. Hickman, a senior research engineer for Southern Services, Inc., in Birmingham, is recognized as an authority on noise problems in Alabama and in the southeast. Dr. Hickman is currently working on the solution and identification of noise problems for the Southern Services Company's electric generating plants which include Alabama Power, Mississippi Power, Gulf Power and Georgia Power companies. He is unaware of any large industries in the Birmingham or in the southeast as a whole which employ noise engineers with a true duty in the field other than OSHA related activities.

Rust Engineering, a consulting firm in Birmingham, employs a noise engineer for noise control activities. The Wylie Laboratory in Huntsville also has a noise engineer on its staff. The United States Army employs a noise engineer at Fort Rucker to work on the development of pilots' helmets.

Most of the large industries in the Birmingham area employ OSHA-type noise control personnel. Safety engineers, as a part of their duties, handle noise control problems within manufacturing plants or other types of heavy industrial facilities, but these personnel are not noise engineers. The Tennessee Valley Authority employs noise engineers in their environmental group at Muscle Shoals to perform monitoring tasks around their facilities. Alabama Power Company is just beginning to perform audiometric testing around their electric generating plants, according to

Dr. Hickman. Alabama and Georgia Power, which are large utilities, have vans equipped with audiometric equipment to perform their noise monitoring. A number of smaller consulting firms perform audiometric testing for companies smaller than Alabama Power and large manufacturers, such as can companies, also hire consultants to perform noise control engineering work. In Dr. Hickman's opinion, most utilities probably do not employ noise control engineers on their staffs, preferring to retain consulting firms. Most utilities have their facilities designed by outside consulting firms which have noise engineering capabilities.

Six Alabama municipalities have some type of noise control ordinances in effect during 1976, according to a survey conducted by Clifford Bragdon, a contributing editor to Sound and Vibration magazine which appeared in its December, 1976 issue. The ordinances are depicted in the following table:

TABLE V

STATE OF ALABAMA
Municipal Noise Ordinances(1976)

City	1970 Pop.	Nuisance	Zoning	Vehicle	Aircraft	Construction	Bldg
Anniston	31,533	0	-	0	-	0	-
Birmingham	300,910	0	-	-	-	-	-
Irondale	3,166	X	0	-	-	-	-
Madison	3,086	-	X	-	X	-	X
Mobile	190,026	0	-	-	-	-	-
Montgomery	133,386	0	-	-	-	-	-

KEY:
X Regulations including acoustical criteria
0 Regulations not including acoustical criteria
- No regulations

C. Workforce Projections

Knowledgeable Alabama sources could not project when a noise pollution control and abatement program could be established for the State of Alabama. The blasting problems resulting from strip mining operations in the northern portion of the state could provide the impetus for state legislation to be enacted in the next several years. More federal EPA activities in the area of noise could also provide an impetus for the establishment of a program. However, as the Alabama legislature is considered by state officials to be very fiscally conservative, it is unlikely that the legislature would be willing to allocate funds for establishing a new program unless federal funds are available to support it.

Dr. Hickman projected that the growth prospect for careers in noise engineering in the next five years in Alabama is not good unless federal initiatives compel the legislature to pass enabling legislation.

D. Training and Certification

Formal noise programs or courses are limited in Alabama. However, a short course entitled "Industrial Noise Control" was offered November 30th through December 1, 1976, in Mobile by the Engineering Extension of Auburn University. The course was prepared for technical and management personnel interested in the field of industrial noise pollution and introduces principles and techniques necessary for the solution of industrial noise problems. The first phase of the course presented an introduction to acoustics and noise control and attempted to present an explanation of to acoustical terminology and frequency distributions of noise. The second phase of the short course was entitled "Noise Control Laws and Regulations" and during this phase the Occupational Safety and Health Act of 1970, the Federal Coal Mine Health and Safety Act of 1969, occupational noise exposure regulations, and current state laws were discussed. The third phase, entitled "Human Factors Associated with Noise", was concerned with the anatomy of the ear, mechanics of hearing, noise-induced hearing loss and psychological effects of human behavior. The second day of the Auburn short course on "Industrial Noise Control" began with the fourth phase of the program, "Basic Noise Measurement Equipment", involving discussions and demonstrations regarding the use of transducers, calibrators and sound level meters. The fifth phase, "Noise Survey Procedures", was designed to present material regarding the classification of noise, data presentation and analysis to the participants. "Basic Noise Measurements", the sixth phase, was a workshop on the use of noise measuring equipment. The seventh phase, "Noise Control Principles and Techniques", was a lecture on how to control noise at the source, noise control in the path and noise control at the receiver. Mounting and stabilization techniques were discussed during the eighth phase of the course entitled "Vibration Control". A program concerning possible solutions to noise problems found in various industries was presented during the ninth and last phase of the short course, "Noise Control for Mechanical and Electrical Equipment".

E. Career Potential

The principal demand for noise control engineers by private industry in the next five years is likely to be for those engineers who could serve as safety engineers but also possess capabilities in the area of noise control. If OSHA decides to accept hearing conservation programs for ear protection purposes within industrial facilities rather than the baffling of machinery to correct the problem, then there is likely to be minimal demand over the next five years for noise control engineers. Sources in the field doubt that OSHA will actually make such a decision but they have had no assurance that OSHA will not. The OSHA decision has been imminent for a year and one-half while economic studies have been commissioned to be performed concerning the problem. Knowledgeable Alabama sources feel that the delay by OSHA in resolving the problem has consequently decreased the demand by industry for noise control engineers. Industries are not considered likely to take action to curtail noise in their industrial operations if there is no clear policy regarding these OSHA-type regulations.

F. Conclusion

The State of Alabama does not currently have a formal program to control and abate noise pollution and there is no clear indication at the present time whether or not enabling legislation for a program will ever be passed by the legislature within the next five year period.

Six Alabama communities have some type of noise control ordinance in effect at the present time. The most common type of ordinance in Alabama is the nuisance variety which usually does not have acoustical criteria included. Zoning, vehicle, aircraft, construction and building noise ordinances are minimally in effect in Alabama's communities.

Other than the preceding, there is currently little activity in the field. Whether or not the field will develop in the future will pivot on public demand and a subsequent legislative demand.

III. PESTICIDES

A. Introduction

The Alabama Pesticide Act of 1971 (Act 1949) authorizes the Department of Agriculture and Industries to identify those pesticides considered by the Pesticide Advisory Committee to be extremely toxic and persistent in the environment or considered to cause other problems of a nature that would require users to have additional education before their use. The Division of Agricultural Chemistry is the State of Alabama's principal agency for the regulation of the use of pesticides. However, the pesticide program is only a part of the Division's responsibilities. The Division also works with commercial feeds, fertilizers and agricultural liming materials, as well as pesticides. The Division operates an analytical laboratory at Auburn which performs the bulk of the Division's analytical work regarding pesticides.

The Alabama Pesticide Act of 1971 is a registration law which was enacted to regulate the sale, distribution and transportation of pesticides in the State of Alabama. Its goals are the following, according to the "Digest of State Pesticide Use an Application Laws", issued by the EPA Office of Pesticide Program's Operations Division:

1) To provide that the sale, offering for sale, distribution and transporation of certain highly toxic pesticides be restricted, limited in use or prohibited;
2) To require the annual registration of pesticides before such products are sold, offered for sale, or delivered or transported within the State;
3) To require permits for the purchase and use of restricted use pesticides;

4) To require a special license for the sale or offering for sale of any restricted use pesticide;

5) To create and establish a Pesticide Advisory Committee to perform certain duties and to provide for the administration and enforcement of the Act by the Commissioner of Agriculture with exemption provisions; and

6) To authorize the adoption of rules and regulations, to provide enforcement and penalty provisions for violations of the Act, and to repeal conflicting laws.

The custom application of pesticides is regulated by a separate statute, Act 1957, which states in part that it is unlawful to "...engage in the custom application of pesticides ... without first procuring an annual license from the Commission" (of Agriculture and Industries) and "to discard, dispose of, or otherwise handle any pesticide in a manner harmful to humans, wildlife, or the environment". The Act exempts the application of pesticides to lawns, trees or shrubs, structural or household pest control activities, application of pesticides by farmers on their own land, and pesticide application by municipalities, counties, state or local governmental bodies. Act 1957 also regulates the custom application of pesticides by aircraft and ground equipment.

The State Board of Agriculture and Industries has the authority to adopt rules and regulations concerning the use of pesticides. Alabama's Pesticide Board is referred to as the "Examining Board" and consists of the Commissioner of Agriculture and Industries (chairperson), an entomologist, a horticulturist, and a plant pathologist from the Alabama Experiment Station. A Pesticide Advisory Committee was created to determine which restricted use pesticide compounds cannot be used by the referring to the label instructions, and which require more complete labeling before use. Act 1957 gives the Pesticide Advisory Committee the "powers and duties to consider and study the entire field of pesticides; to review and make recommendations to the Commissioner on any pesticide registration submitted to it by the Commissioner; and to advise, consult, and counsel with the Commissioner upon his request in connection with the promulgation, administration of all laws, rules, and regulations relating to pesticides". The Pesticide Advisory Committee consists of the following members:

1) Two members from the School of Agriculture and Agricultural Experiment Station of Auburn University to be appointed by its Director;
2) Two members from the Cooperative Agricultural Extension Service of Auburn University to be appointed by its Director;
3) Two members in the employment of the State Department of Agriculture and Industries to be appointed by its Commissioner;
4) Two members in the employ of the State Department of Public Health to be appointed by the State Health Officer;
5) Two members in the employ of the State Department of Conservation to be appointed by its Director; and
6) Two members from the Alabama Pesticide Institute to be appointed by its Board of Directors.

When Act 1957 was first enacted, it was intended to apply to agricultural applicators, but the statute was broad enough to include all of the EPA categories except aquatic, seed treaters and public health. These three categories are currently covered as a public service under the pesticide registration program. There is currently amendatory legislation before the Alabama Legislature to bring all of the ten EPA categories under the authority of the statute.

B. Workforce Profile

The Division of Agricultural Chemistry, which is a part of the Alabama Department of Agriculture and Industries, is responsible for the registration of all restricted use pesticide compounds currently in use or offered for sale in the State of Alabama. It is responsible for ensuring that integrated pesticide products offered for sale are guaranteed. The Division investigates and receives complaints from the general public and can subject integrated pesticide products to a product review and regulatory action if discrepancies are found in the product labeling. The Division's field inspectors collect samples of pesticide compounds from sealed containers and refer samples for laboratory analysis. Products are removed from the market if the pesticide compounds are either deficient in their guarantees or over-formulated.

The Division's Agricultural Operation Section employs eight inspectors who are responsible for the regulation of pesticides for the entire State of Alabama. Two inspector positions are currently vacant, and there is no assurance that they will be filled in the near future. An agricultural inspector requires, at the entry level, graduation from high school and three years of public contact work. Of the six inspectors who are in the field, four are new recruits and are currently receiving on-the-job training. These inspectors are residents of the areas for which they have responsibility. The areas are as follows:

Mobile - Southwest Alabama
Greenville - Southeast Alabama
Montgomery - Central Alabama
Russellville - Northwest Alabama
Cullman - North Central Alabama
Anniston - Northeast Alabama

Requests for assistance received from the general public are becoming so frequent that the current number of inspectors is too few to conduct a thorough pesticide program, according to officials. As the Division has programs for inspecting fertilizers, feeds and limestone, as well as pesticides, the personnel are shifted to various programs on a seasonal basis.

The Division of Agricultural Chemistry's analytical laboratory at Auburn has a total staff of twelve. These twelve persons include the laboratory director, five chemists, three laboratory aides, a grindman to prepare samples, a secretary and part-time help.

The Division of Solid Waste and Vector Control of the Environmental Health Administration in the Department of Public Health employs an environmentalist who is an entomologist and who works on public health vectors such as mosquito and rat control. The director of the Division of Agricultural Chemistry estimated that there are approximately 400 communities in Alabama which have vector control programs, and each program has at least one person who uses pesticides.

Alabama's pesticide industry includes formulators, dealers, and major manufacturers. Formulators include the Riverside Chemical Company, Goldkist (Cotton Producer's Association), Helena Chemical Company and the Alabama Farmer's Cooperative.

There are 146 custom applicators and 275 supervisors currently operating in Alabama. According to the "Regulations Governing the Custom Application of Pesticides by Aircraft and Ground Equipment", an applicant for a custom pesticide applicator's license, which is issued annually by the Commissioner, must place each place of business under the direct supervision of a certified supervisor. The supervisor is responsible for the applicator's business operations. An applicant for certification as a supervisor must be supervised in varying degrees for a minimum period of twelve calendar months. A minimum of three months must be spent as an acting assistant to a supervisor. Supervisors are classified according to the type of pesticide application, and supervisor certification cards and custom pesticide licenses are issued in accordance with the following categories:

I: Demonstration Pest Control
II: Agricultural Pest Control
III: Forest Pest Control
IV: Right-of-Way Pest Control

The 146 licensed custom pesticide applictors currently licensed in Alabama include both aerial and ground categories. Approximately 16,000 permitted private applicators are allowed to apply restricted use pesticides. This total includes all who have purchased or applied restricted use pesticides, including supervisors.

In 1972, when the Division of Agricultural Chemistry started licensing, there were 584 pesticide dealers doing business in Alabama. In 1973, Alabama lost 102 dealers, to bring the total in November, 1976, to 434 licensed pesticide dealers. Since there are 434 licensed pesticide dealers in Alabama and 16,000 permitted users of restricted use pesticides, the Division has, for obvious reasons, placed its enforcement effort on the dealers. With a small regulatory staff, this approach is considered the most effective.

The following table depicts the total number of persons in Alabama involved in the pesticide workforce as of November, 1976:

TABLE VI

STATE OF ALABAMA

Pesticide Public and Private Sectors Current (1976) Staffing Level

Public Sector		1976
Division of Agricultural Chemistry		20
Cooperative Extension Service		7
Pesticide Advisory Committee		7
Municipal Vector Control Programs		400
Environmental Health Administration		1
	TOTAL	435
Private Sector		
Custom Applicator (ground and aerial)		146
Supervisor		275
Pesticide Dealer		434
Private Applicator		16,000
	TOTAL	16,855

C. Workforce Projections

The Alabama Legislature is currently (February, 1977) meeting in its regular annual session to consider the state budget for Fiscal Year 1977. Although staffing needs have been voiced by administrators for pesticide programs, these professionals do not foresee that the Legislature will provide funds during this session for additional personnel.

The director of the Division of Agricultural states a need for seven additional field inspectors by 1978 and twenty by 1982 for field operations. Five of the seven needed for 1978 are for the pesticide program. Division officials consider a total of fourteen field inspectors to be the minimum required to continue delivering adequate services for the Alabama public. The shortage of inspectors, according to the director is the most serious problem faced over the next five-year period. A limited staff of seven field inspectors cannot fulfill all demands for assistance by the public. The pesticides program also needs an additional assistant director and a clerk/typist.

The Division Director expects the Guthrie Laboratory (the Division's analytical laboratory) to increase its staff by 25 percent, or by three persons by 1978. The three additional chemists will be recruited after the laboratory is completed.

The average annual turnover rate for the Division of Agricultural Chemistry is approximately five percent. Of the two inspector positions recently lost, one was through transfer and the other through retirement. These two positions represent the only staffing level changes since 1975.

State sources anticipate that it will be five to ten years before Alabama has a cadre of well-informed users of restricted use pesticides. Conversely, Alabama's pesticide dealers receive special training during their annual licensing session and are considered to be well-informed concerning the use and application of pesticides. A recent survey conducted by the Division showed that 85 percent of pesticide users in Alabama receive recommendations concerning the use of restricted use pesticides from pesticide dealers. Although the Division's official policy is not to encourage dealers to make recommendations, officials do recognize that dealers are the most available sources of information.

The number of ground and aerial custom applicators is anticipated to annually increase by two to three percent to 1982, as is the total number of supervisors. The projected increase in the number of commer-custom applicator establishments in the next five-year period is from the expectation of the Division Director that some private applicators will retain custom applicator firms to apply pesticides because the risks from misuse are great and attaining certification is becoming increasingly difficult for private applicators.

The following table depicts estimated increases in the numbers of custom applicators and supervisors. It, however, shows a decline in the number of private applicators which is probably a consequence of more individuals, e.g., farmers, having pesticides commercially applied. The number of dealers is expected to remain constant.

TABLE VII

STATE OF ALABAMA

Pesticide Workers
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum Growth/ Decline
Custom Applicators	146	150	155	160	165	170	3%
Supervisors	275	283	291	300	309	319	3%
Pesticide Dealers	434	434	434	434	434	434	0
Private Applicators	16,000	15,500	15,000	14,500	14,000	13,500	-3%
TOTAL	16,855	16,367	15,880	15,394	14,908	14,423	-3%

D. Training and Certification

Most of the staff training offered for the Division of Agricultural Chemistry personnel is informal and on-the-job. New agricultural field inspectors are assigned to work with experienced inspectors for six months, traveling in the field and observing the experienced professional. The role is then reversed and the new employees take the lead while the experienced inspector observes and corrects mistakes.

The Director of the Division occasionally sends staff to pesticide-related courses at nearby universities when such courses are available. A one-week training session is occasionally held for staff inspectors of the Division of Agricultural Chemistry, and is conducted by experienced staff instructors. An inspector experienced in aerial application demonstrates how to attach spray equipment to aircraft and how the pesticides are applied from the air. Certain training courses sponsored by the Alabama Aerial Applicator Association are also attended by the Division's field inspectors. The Association's training courses provide opportunities for the field inspectors to obtain formal training in pesticide application by aircraft, to become acquainted with the equipment, and to make aerial applications.

The Auburn Extension Service provides an annual training program during the pesticides conference. Short courses are held by the Extension Service which are considered by the Director of the Division of Agricultural Chemistry to be of high quality. Training is also offered for agricultural inspectors and other persons in the field by the Alabama Chapter of the American Pesticide Control Operators Association.

A training program covering incident inspections was recently conducted by the Division of Agricultural Chemistry. Representatives from other state investigative organizations were invited to attend. A conservationist spoke of the environmental consequences of pesticide usage on wildlife and fisheries, and the Department of Fisheries of Auburn University presented a one-day seminar concerning the investigation of fish kills.

As the Division has access to a state entomologist, an analytical laboratory and the School of Agriculture at Auburn University, additional training needs of the field inspectors could be provided from these persons and organizations. The School of Agriculture at Auburn University is available for training support whenever the Division is overburdened by work. The Division's chief agricultural inspector and the pesticide education specialist from Auburn University offer training courses at ten locations throughout the State.

A day-long training course is provided annually to Alabama pesticide dealers during their annual recertification session. The examination for the dealers is prepared and assembled by representatives of the School of Agriculture and the Cooperative Extension Service at Auburn University. Additional assistance is provided by the Department of Agriculture and Industries. During this annual training and examination session, the Division attempts to explain to the dealers which pesticides can be substituted safely for others. The dealers are then tested over the information. The examinations are graded during the session and the answers to the questions are explained.

To obtain a twelve month license, a custom applicator must make application and register all equipment with the Division of Agricultural Chemistry. Further, the storage facilities and spray equipment of applicators are subject to inspection by the Division. The custom applicator must post a surety bond or possess a liability insurance policy containing a deductible clause in an amount acceptable to the Commissioner of Agriculture.

E. Career Potential

The Director of the Division of Agricultural Chemistry was unable to identify any new career types that may be arising in the pesticide field in the next five years. However, the number of pesticide custom applicator businesses operating in Alabama is expected to increase gradually in the next few years as a result of enforcement of FIFRA.

F. Conclusion

The most pressing need of the Division of Agricultural Chemistry is adequate staff to perform its assigned regulatory responsibilities. Although field inspectors are being requested by the public to provide increasing enforcement and public services, it is considered unlikely by sources in the field that the Alabama Legislature will appropriate additional funds to support staff increases. Although the State of Alabama has between 16,000 and 20,000 private pesticide applicators that require additional training, none have been trained at the time a report from the Operations Division, Regional Support Branch of EPA was issued. This report was based on first quarter Fiscal Year 1977 activities. As the State has all private applicators currently applying restricted use pesticides under registration, the Division and the State Extension Service are anticipated to be heavily involved in the training of these applicators to meet the October 21, 1977, FIFRA deadline.

The new Federal Toxic Substances Control Act recently passed by Congress is not anticipated by Alabama officials to impact their workforce needs. The Director of the Division of Agricultural Chemistry suggested that, for the state to assume responsibility for this program, a new department in the Alabama government would have to be created. This department would require expanded chemistry and chemical engineering capabilities.

IV. POTABLE WATER

A. Introduction

Alabama's potable water program is a functional responsibility of the Division of Public Water Supplies in the Environmental Health Administration which is a part of the Alabama Department of Public Health. The Division is responsible for the conservation and protection of Alabama's resources and the health of its citizenry.

Statutory authority for the Division's activities rests in Chapter 3, Title 22, Sections 117 through 140, passed in 1919. The State Board of Health has supervision and control over water supplies and waterworks of the state.

Alabama's certification program has been in existence since 1966, although the mandatory requirement for certification of operators was not formally authorized until 1971, under Act 1594. The Board of Certification was also created by the Act and consists of eight members appointed by the State Health Officer. Act 1594 requires the state to:

> ...protect the public health and to conserve and protect the resources of the state by classifying all public water supply systems and wastewater treatment plants in this state and by requiring the examination of operators and certification of their competency to supervise the operation of such facilities; and to create and provide for a board of certification for such purpose and providing that the acts shall not apply to counties of 600,000 or more.

The Division has expressed an intent to assume primary enforcement responsibilities for the Federal Safe Drinking Water Act (PL 93-523). The Division has received EPA funding to enable the state to prepare for the assumption of primacy. State officials expect to be in full compliance with the provisions of the Act by June, 1977. A bill to revise the state's drinking water regulations for complying with the federal act is currently before the Alabama Legislature.

B. Workforce Profile

Including the Water Well Standards Board, the Division of Public Water Supplies consists of a total staff of eighteen people. The director represents the Divison in policy and legal matters and reviews and sets priorities. The Water Well Standards Board is responsible for the licensing of well drillers and private well contractors in the state. The Board is staffed with one secretary and two environmentalists. In Alabama, an environmentalist entry level position requires a bachelor of science degree with a minimum of 35 hours in the social sciences, according to the merit system position description. An environmentalist employed with the State of Alabama does not have the technical background of an engineer, and, in the Environmental Health Administration, they are usually assigned to district offices to work assisting the various counties in the state. The Division of Public Water Supplies has six major sections and their abbrieviated functions are as follows:

1) Administration and Program Development Section: Provides general supervision over the entire public water supply program. Coordination is provided for the development of rules, regulations and policies for the Division. Serves as liaison with EPA and other agencies. Assists the director on legislative matters. Prepares annual grant applications, budget and staff requirements. Staff consists of three engineers and one secretary.

2) Surveillance, Plan Review and Technical Assistance Section: Responsible for surveillance of Alabama's public water supplies. Makes an annual sanitary survey of water systems and conducts inspections for a complete review of the operational features of the state's water systems. Reviews plans and specifications for the construction of water works facilities, and if the plans are considered acceptable, permits authorizing construction are issued. Responsible for the maintenance of an inventory of water systems in Alabama. Provides technical assistance to water systems operators. Provides advice to consultants concerning design problems and assistance to various planning agencies.

3) Water Quality Control Section: Oversees the Division's chemical and bacteriological sampling program. Schedules bacteriological samplings for all public water systems in the state, and in the process of scheduling, these activities are coordinated with the laboratories of the Environmental Health Administration. Ascertains that the monitoring schedules called for in the primary drinking water standards are being followed. Reviews all the results from chemical analyses and takes results of monitoring samples to the Division's other sections and in cases of non-compliance, results are furnished to the Surveillance and Enforcement Sections for legal actions.

4) Training and Certification Section: Plans and coordinates training courses for water works (water treatment plant and distribution system operators) throughout Alabama. Assistance for planning activities is also provided for the Alabama Water Pollution Control Association's annual short course and training session. Provides technical assistance to the Board of Certification for Water and Wastewater Operators. Reviews applications from operators for certification and maintains an inventory of certified operators.

5) Laboratory Certification Section: Coordinates the laboratory certification program with the Clinical Laboratory Administration and the Environmental Health Administration Laboratory. Maintains an inventory of certified laboratories and coordinates schedules for certification with other certifying organizations.

6) Enforcement Section: Enforces all of the rules and regulations of the Division of Public Water Supplies. Works closely with the Division director on violation matters which include violations of drinking water standards, certifications, variances and exemptions. Coordinates its activities with the Environmental Health Administration's legal staff and director.

7) Data Management Section: Supplies necessary information for computer programming to the Department of Public Health's data management section. Inventories are maintained of water supplies, certified operators, and certified laboratories in Alabama. Maintains records of chemical and bacteriological analyses and violations.

Including the Water Well Standards Board, the Division has a staff of fifteen full-time personnel with part-time assistance provided by three secretaries. Seven civil engineers are employed by the Division and three have master's degrees and are registered professional engineers, including the director. One environmentalist is assigned to the Division and two are assigned to the Water Well Standards Board. The Director and four full-time secretaries make up the rest of the Division's total staff.

The following table depicts the current workforce level for full-time personnel employed by the Division of Public Water Supplies and the Water Well Standards Board:

TABLE VIII

ALABAMA DEPARTMENT OF PUBLIC HEALTH

Environmental Health Administration
Division of Public Water Supplies
Current (1976) Staffing Level

Position		1976
Engineer (Civil)		6
Environmentalist		3
Other [1]		5
	TOTAL	14

[1] Includes the director and four full-time secretaries. Not included are three part-time secretaries which account for 1.5 person-years.

The Environmental Health Administration Chemical Laboratory analyzes supply samples for the Division of Public Water Supplies. The Laboratory is currently staffed with a total of 15 persons, including seven scientists, two technicians, two laboratory aides and three secretaries. The current workforce level for the Division of Laboratories is as follows:

TABLE IX

ALABAMA DEPARTMENT OF PUBLIC HEALTH

Environmental Health Administration
Division of Laboratories
Current (1976) Staffing Level

Position	1976
Radiation Physicist	3
Chemist	3
Assistant Chemist	2
Laboratory Aide	1
Student Aide	1
Laborer	1
Other *	4
TOTAL	15

*Includes one Public Health Service Commissioned Officer who is the Laboratory Director and three secretaries.

Eight bacteriological laboratories in the state perform bacteriological analyses for drinking water. These laboratories are located in: Mobile, Dothan, Selma, Montogomery, Tuscaloosa, Birmingham, Anniston, Decatur, and Huntsville. Employed by these laboratories are bacteriologists who perform these drinking water analyses on a part-time basis. The specific number of these scientists is not readily available. A certification program for bacteriological laboratories is carried out by the state.

The State classifies all water treatment plants, water distribution systems and wastewater treatment plants according to the size, type and character of treatment. These facilities are also classified according to the skill, knowledge and experience that an operator must have to supervise the operations of such facilities. A water distribution system operator in Alabama, according to Section 15 of the "Rules and Regulations for Certification of Water and Wastewater Operators" has responsibility for the following:

> A) Water Distribution Systems: Water distribution personnel with the rank of work crew foreman or higher shall be certified as Grade I Operators in accordance with Section 4 of these Rules and Regulations. A certified operator may maintain supervision over more than one distribution system only if it can be shown that adequate supervision to ensure safe effective operation is provided to all applicable facilities.

Also, according to Section 15 of the "Rules and Regulations for Certification of Water and Wastewater Operators", an operator of a water treatment plant facility shall be in accordance with the following:

> B) Water Treatment: A water treatment facility must have an operator certified equal to or higher than the facility classification. A certified operator may maintain supervision over more than one facility only if its classification is Grade II, and if it can be shown that adequate supervision to ensure safe and effective operation is provided for all facilities supervised.

In Alabama, water systems are classified Grades I through IV with a Grade I facility the lowest classification (distribution systems or those who purchase water from other systems such as FHA systems) and Grade IV being advanced surface water treatment plants. According to Section 4 of the "Rules and Regulations", the four grades are as follows:

Classification of Water Systems and Operators

Grade	Description
I	Distribution systems only.
II	Systems with ground water supplies.
III	Basic surface water treatment plants and advanced ground water treatment.
IV	Advanced surface water treatment plants.

A total of 1,098 water treatment operators were certified in Alabama as of September, 1976. The following table illustrates the distribution of certified treatment plant operators by operator classification:

TABLE X

STATE OF ALABAMA

Current (1976) Certified
Water Treatment System Operators

Classification	1976
I	147
II	483
III	322
IV	146
TOTAL	1,098

Alabama has a total of 77 surface water treatment plants serving 60 municipalities, 1,150 to 1,200 non-community or semi-public well supplies and approximately 400 community or municipal ground water supplies.

C. Workforce Projections

Workforce projections are based upon the best available professional judgements of personnel of the Environmental Health Administration and of the Division of Public Water Supplies. Of particular assistance in compiling data for this report were Mr. Willian T. Willis, the director of the

Environmental Health Administration and Mr. Joseph E. Downey, the director of the Division of Public Water Supplies.

If Alabama receives primary enforcement responsibilities for the Safe Drinking Water Act, according to Mr. Willis, the Division of Public Water Supplies could double its staff in the next five years from the present level of fifteen full-time staff members to 31 by 1981. The Division intends to ask the Alabama Legislature for approval to hire an additional 16 personnel to carry out the Act. The positions would be financially supported by federal funds and approval is expected. Division officials were unable to project when the personnel would actually be hired as the state must first revise its merit hiring system. The 16 additional staff would probably include five engineers, four environmentalists and seven secretaries. Four of the seven secretaries would be hired for the expected increased paperwork and filing required for additional chemical and bacteriological samplings. The following table represents projected growth by profession for the Division of Public Water Supply to 1982.

TABLE XI

STATE OF ALABAMA

Potable Water Program Operations Projected
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	6	8	9	10	11	12	n/a	15%
Environmentalist	3	3	4	5	6	7	n/a	19%
Other	5	6	7	9	11	12	n/a	19%
TOTAL	14	17	20	24	28	31	5%	17%

The Division of Public Water Supplies has remained stable in its staffing levels, experiencing only minimal turnover. In June, 1976 two engineers were recruited and the last engineer to have left the Division did so in 1972. The estimated average annual turnover for the Division is estimated by its officials at five percent. Budgetary restrictions necessitated terminating two sanitarians in 1975.

D. Training and Certification

After working for the Division of Public Water Supplies two years, engineers are sent back to school for a master's degree in sanitary engineering. To reach the top of the career ladder, an engineer must both be a registered professional engineer and have received a master's degree. The Department of Public Health pays tuition, salary and expenses for the employee's moving to and from the school. Engineers are allowed to express their preference for schools but the final selection is made after consultation with the division director.

The director of the Division of Public Water Supplies considers on-the-job training to be a very effective way to provide training for a new engineer beginning employment at the Division.. One engineer spends about 25 percent of his time assisting new engineers in on-the-job training. The director estimated that a new engineer can become functionally competent on the job only after six months on-the-job training.

Alabama has a Water Treatment Training Program conducted by the Trade and Industrial Education Service of the State Department of Education. The program is sponsored by the State Department of Education in cooperation with the local Boards of Education. This tuition free training program for water works operators is designed to "provide opportunities for all operating personnel to acquire, through an organized procedure, the knowledge and skills needed for competent operation of water plants and systems", according to the descriptive brochure prepared by the State Department of Education. The courses are offered in several phases and it requires approximately one year to complete the full program of courses. The courses are designed to take into account the particular varied needs of the localities. According to the Trade and Industrial Education Service's brochure entitled, "Water Treatment Training Program: State Instructor Program", the following courses are offered for water treatment plant operators by the State of Alabama:

1) State Water Law and the Water Works Operator
2) Communicable Disease, Bacteriology, and Disinfection of Water
3) Introduction to Chemistry
4) Records, Calculations and Simple Hydraulics
5) Sources of Water in Alabama; Ground Water, Wells and Springs
6) Treatment of Well and Spring Water
7) Introduction to Surface Supplies and Raw Water Intake
8) Coagulation
9) Mixers, Flocculators and Settling Basins
10) Rapid Sand Filters
11) Chlorinators
12) Laboratory Control Tests
13) Control of Corrosion, Tastes, Odors and Toxic Substances
14) Industrial Water Uses
15) Water Tank Maintenance
16) Distribution System
17) Fluoridation of Public Water Supplies
18) Radiological Health
19) Cross Connections

The Adult Education Division of the State Department of Education employs one full-time training specialist to conduct water treatment training courses across the state. Forty-two classes are held annually and approximately 800 persons attend the courses, according to the director of the Division of Public Water Supplies. A minimum of ten hours of instruction was offered in 33 areas in Fiscal Year 1976. Nine local instructors, from water works or utilities boards, assist the full-time training specialist when he is in their area. Classes usually have less than 30 people in attendance and each person receives an average of 15 hours of instruction. Computed on a basis of 20 persons per week attending the classes for forty weeks, the annual total for 1976 was 800 persons attending the water treatment training courses in Alabama.

Water treatment plant operators are usually brought from a 30 to 40 mile radius of the area where the course is being conducted and a full session usually lasts between 54 to 61.5 hours. According to the "1976-1977 Schedule Water Treatment Training" document, the courses presented by Mr. Bob J. Fowler, Training Specialist, are according to the following basic outline:

BASIC OUTLINE FOR WATER CLASSES

I. Introduction (3 Hours)
II. Communicable Diseases and Bacteriological Sampling and Reports (6 Hours)
III. Ground Water Supply Introduction
IV. Basic Calculations - P.P.M., Lbs. of Chemical, and Unaccounted for Water (6 to 7.5 Hours)
V. Disinfection and Chlorinators (6 Hours)
VI. Fluoridation and Cross Connections (3 to 4.5 Hours)
VII. Corrosion and Control (6 Hours)
    A. Relationships of pH, Alkalinity and CO_2
    B. Corrosion Control
VIII. Basic Well Water Treatment and Feeder Calibrations (3 to 4.5 Hours)
IX. Distribution and Water Tank Maintenance
X. Simple Hydraulics (6 to 7.5 Hours)
XI. Review (6 Hours)

Other training is offered by the Alabama section of the American Water Works Association which holds management seminars, chlorination workshops and safety meetings for its members. The seminars are jointly sponsored by the Alabama and Mississippi Sections of the American Water Works

Association. The Association also sponsors regional seminars which Alabama's members attend.

In 1975, Alabama received between 40 to 60 hours of basic electronics instruction from the State Department of Education at the Gennysville Trade School. The course was designed to teach basic electronic equipment repair. The 1976 phase of the course was discontinued due to a lack of funding.

The Alabama Water and Pollution Control Association conducts an annual short course for operators alternating locations between Auburn University and the University of Alabama. Certification examinations are administered by the state for operators completing this short course. The examinations for certification of wastewater and water treatment plant operators are prepared by the Water Improvement Commission and the Division of Public Water Supply.

E. Career Potential

After the State of Alabama assumes primary enforcement responsibilities for the Safe Drinking Water Act, and the State Legislature revises Alabama's regulations to comply with the federal law, career potential in the State of Alabama's Division of Public Water Supplies will improve. State officials estimated that the Division's staffing level in the next five years may double and additional engineers, environmentalists and secretaries will be hired. The director may also hire an epidemiologist, chemist or a chemical engineer as the Division needs a person with a chemistry background to assist in with enforcement of the Act.

Preference in hiring engineering personnel from the State merit register is given to those with a broad general background in engineering, according to the director of the division.

F. Conclusion

The Alabama potable water program has definite growth prospects for the next five-year period as a result of the anticipated assumption of primacy over the Safe Drinking Water Act (PL 93-523). The state will probably not assume responsibility for the program until sometime in 1977. Increased enforcement responsibilities are also likely to increase the number of operators requiring training and certification over the next five years.

The Alabama Legislature is currently meeting in its annual session (February, 1977),and a bill to adopt regulations to comply with the Safe Drinking Water Act will be presented. The bill is supported by Alabama's water supply industry,and no opposition to the bill has been detected by Environmental Health Administration officials.

The Division of Public Water Supplies has received a first year grant amounting to $150,000 from EPA based on the state's assurance that the legislature will make the necessary changes to bring the state into compliance with the Safe Drinking Water Act. Division officials do not foresee any additional state funding forthcoming, and further funding for the program would have to come from EPA. Precise projections of what the state program will need to enforce the Act is not available at this time since EPA has not come up with exact modifications on their regulations for chlorinated hydrocarbons, PCB's and asbestos.

V. RADIATION

A. Introduction

Alabama's radiological health program was implemented in 1963 after the passage of Act Number 582, which authorized licensing and regulation of sources and users of machines and devices producing ionizing radiation and those using radioactive materials. The Act further provided for the creation of a Radiation Advisory Board to review and evaluate policies and programs relative to ionizing radiation and to advise the State Board of Health on any matter coming before the agency. Day-to-day functions concerning the radiation control program are carried out by the Division of Radiological Health of the Environmental Health Administration in the Alabama Department of Public Health.

The Alabama General Assembly is to convene in February, 1977, and a radiation bill will be submitted to it which is considered by Mr. William T. Willis, director of the Environmental Health Administration to be a "key bill". If it is not passed, the radiological health program will have to operate below a desirable level, especially with regard to the inspection of medical and dental X-ray equipment. The radiation bill is actually a "fee bill" from which they will be able to acquire additional monies to hire personnel for the medical and dental X-ray program.

The Bureau of Environmental Health in the Jefferson County Department of Health, which includes Birmingham in its jurisdiction, has the State's only local radiation control program. This program is located in the Division of Radiological Health and is one of eight divisions within the Bureau of Environmental Health in Jefferson County.

Alabama has an active environmental radiation monitoring station located in Montgomery with a standby ambient sampling station located in Muscle Shoals.

B. Workforce Profile

Data for the workforce profile and projections was collected through on-site and telephone interviews with State and local Alabama officials. Of particular assistance was Mr. Aubrey Godwin and Mr. William T. Willis, both of the Environmental Health Administration.

The Division of Radiological Health has a professional and technical staff of seven persons to carry out radioactive materials licensing and inspection, radiation-emitting machine registration and inspection, environmental monitoring, and emergency response procedures. The Division's staff has responsibilities broken into sections:

1) X-Ray Compliance Section: Responsible for the inspection of all radiation producing machines. There are 4,000 inspected and registered by the Division.
2) Radiation Materials Compliance Section: Conducts inspections of facilities which use radioactive materials.
3) Radioactive Materials Licensing Section: Registers radioactive materials and X-ray producing machines.
4) Administrative Section: Coordinates activities of the other three sections.

All four sections participate in the Division's development and testing of emergency response procedures for accidents involving radioactive materials. The staffing level of the Division of Radiological Health is as follows.

DIVISION OF RADIOLOGICAL HEALTH

Figure 3

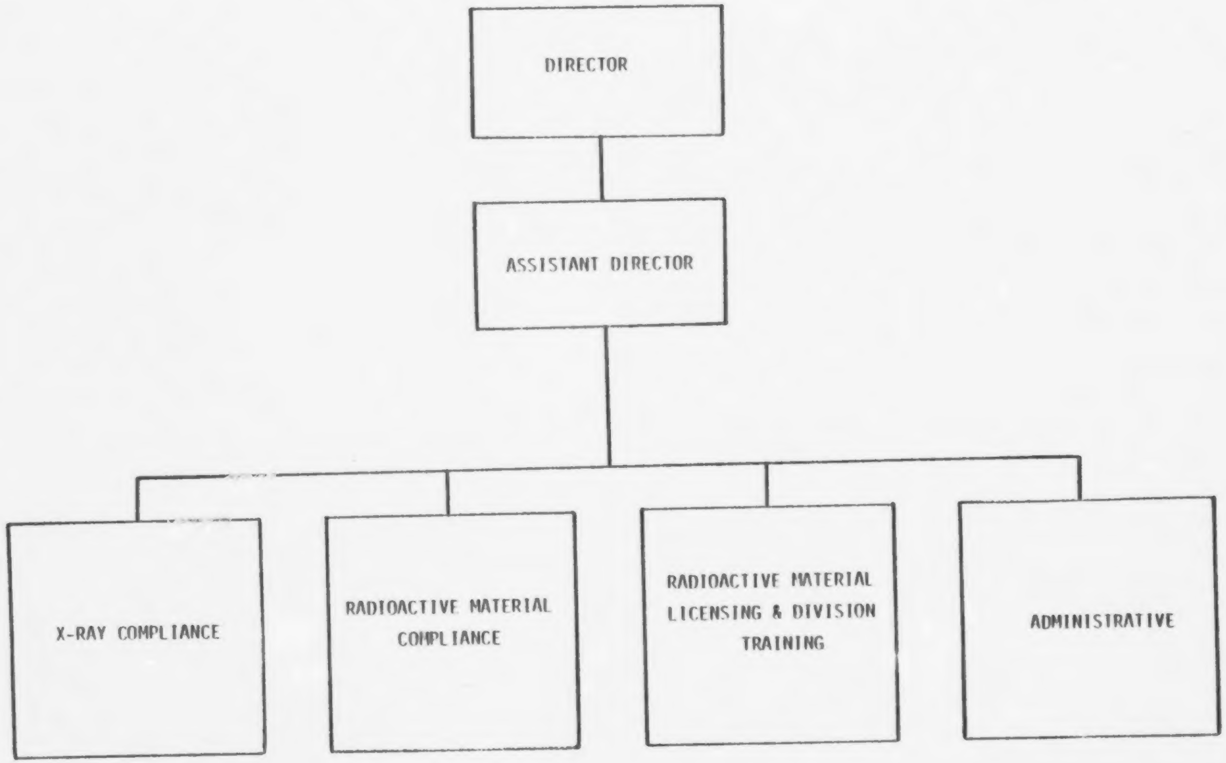

DIRECTOR
ASSISTANT DIRECTOR
X-RAY COMPLIANCE
RADIOACTIVE MATERIAL COMPLIANCE
RADIOACTIVE MATERIAL LICENSING & DIVISION TRAINING
ADMINISTRATIVE

TABLE XII

ALABAMA DEPARTMENT OF PUBLIC HEALTH

Division of Radiological Health
Current (1976) Staffing Level

Position	1976
Physicist	3
Technician [1]	1
Other [2]	3
TOTAL	7

[1] Includes one radiation safety specialist, who is a registered X-ray technician.

[2] Includes the director and one clerical position.

Jefferson County's Division of Radiological Health has a total staff of two persons: a public health physicist and a radiological health inspector. This Division is charged with the enforcement of Alabama's radiation control laws and determines whether or not user facilities are in compliance. The Division also inspects microwave ovens to ensure that they are in compliance with Federal requirements for non-ionizing sources of radiation. The Division's staff inspects users of radioactive materials in cooperation with the State's Division of Radiological Health. Investigations of accidents and overexposures involving X-rays and radioactive materials are also conducted. A registry of all X-ray machines in Jefferson County is maintained and technical advice is provided for shielding radiation devices.

C. Workforce Projections

Officials of the State's Division of Radiological Health intend to fill two currently vacant radiation safety specialist positions during 1977. If the Legislature approves the Environmental Health Administration's budget request in 1977, three registered X-ray technicians and two health physicists will be recruited in 1978. One health physicist position would be allocated to the X-Ray Compliance Section to increase its inspection capabilities. No further requests are planned for the period of 1979 to 1982. The Division experiences an annual turnover rate of about five percent, or one radiation physicist every two years, according to program officials. Workforce projections are as follows.

TABLE XIII
ALABAMA DEPARTMENT OF PUBLIC HEALTH
Division of Radiological Health
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Radiation physicist	3	3	5	5	5	5	5%	13%
Technician	1	3	6	6	6	6	n/a	60%
Other	3	3	3	3	3	3	n/a	0%
TOTAL	7	9	14	14	14	14	5%	17%

Jefferson County's Division of Radiological Health has plans to increase its staff significantly within the next five years. According to Mr. Paul Pate, Director of the Bureau of Environmental Health, the Division of Radiological Health's staff may double in size within the next five-year period. For the budget period of Fiscal Year 1977, the Division plans to hire an additional radiological health inspector and a public health physicist. The program will expand to cover such things as the regulation and inspection of microwave ovens, laser devices, and other high frequency wave-producing equipment.

The following table depicts workforce projections to 1982 for Jefferson County's Division of Radiological Health, based upon the best professional judgments of professionals in the field.

TABLE XIV
STATE OF ALABAMA
Jefferson County Bureau of Environmental Health
Division of Radiological Control
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Health Physicist	1	2	2	2	2	2	n/a	20%
Inspector	1	2	2	2	2	2	n/a	20%
TOTAL	2	4	4	4	4	4	n/a	20%

D. Training and Certification

To upgrade the Division of Radiological Health's (Stat) personnel, the division director sends staff radiation physicists to a ten-week course offered at the Oak Ridge National Laboratory by the Nuclear Regulatory Commission. He feels that this course, which is designed for health physicists, is adequate for certain purposes, but no training is offered pertaining to environmental matters. Training is provided in this course on inspection techniques and basic licensing. Regrettably, the director of the division feels that courses pertaining to environmental matters in the field of radiation control are not very prevalent.

State officials have expressed needs for the development of short courses that include the following: a) inspecting and regulating radiation-producing materials and equipment; b) inspecting and regulating radiation problems in phosphate mines; and c) fundamentals of environmental health.

Many radiation physicists from the staff of the division have been sponsored to Florida State University and the University of Michigan to study for master's degrees. Only those persons who have been with the division at least three years may participate in this stipend program.

The Division utilizes the following universities for post-graduate and short course staff training:

Florida State University
University of Michigan
University of Alabama
Auburn University
Troy State University
University of Mississippi
University of Florida

E. Career Potential

The director of Alabama's radiological health program feels that there is good career potential in the radiological health field but not with the State of Alabama. He feels that employment with the State of Alabama's program is a good training ground for a young radiation physicist to obtain practical experience, but it would take such a person approximately seven years to advance to a higher administrative position. After a person has reached this level, he or she is usually recruited either by the Federal Government or by a private contractor, and receives higher pay. Division officials (State) foresee no new technological developments in the field of radiation control that are likely to provide new types of careers.

F. Conclusion

The future for technicians and professionals in the radiological health profession in Alabama is not too promising, at least at the State and local level. Alabama has a rapidly developing coal strip mining industry in the northern mountains which may discourage plans for the future construction of new nuclear reactors. Moreover, the Alabama Legislature is very financially conservative and unlikely to allocate additional State funds to greatly expand existing programs.

In Jefferson County, the radiological health program is expanding its staff of two to four in the next several years, but this does not represent much of a career potential for the field as a whole. Regulatory officials recognize the fact that non-ionizing radiation producing machines such as microwave ovens and lasers are increasingly being used, so there may be more of a need for radiation safety officers within private industries to monitor these machines for leakage, but not in great numbers.

VI. SOLID WASTE

A. Introduction

The State of Alabama's solid waste management program is based on a cooperative arrangement with approximately 200 local county environmental officials. According to a survey conducted by the staff of the magazine, Solid Waste Systems, appearing in the October/November, 1976 issue, Alabama has a total of 131 sanitary landfills of which 125, or 96 percent, are publicly owned and operated. Of the total number of sanitary landfills operated in Alabama, only six, or five percent, are contractually owned. The survey further indicated that Alabama does not currently have any privately owned sanitary landfills in operation.

A new solid waste management bill was drafted to be compatible with the new federal Resource Conservation and Recovery Act of 1976, and is currently before the Alabama Legislature for ratification (March, 1977). According to the director of the Environmental Health Administration, of which the Division of Solid Waste and Vector Control is a part, the bill has the support of Alabama's industry. Alabama's solid waste management program is a minimal program with an annual budget of between $50,000 and $60,000. The Alabama program's Fiscal Year 1977 budget, as a consequence of the new federal Act, is anticipated to be $100,000. The Division of Solid Waste and Vector Control currently receives federal funds for operations and the director of the Division is a federal employee; his salary is paid with federal funds.

Mr. William T. Willis, the Director of the Environmental Health Administration, expects the solid waste management program to change significantly in size of budget and program objectives in the next five years as a result of the new mandatory federal controls on hazardous wastes and EPA grants to Alabama to develop the state's own disposal plans.

Once the Alabama Legislature passes the Alabama "Hazardous Wastes Management Act of 1976", which the director of the Environmental Health Administration (EHA) is confident that it will, the state will be eligible for federal grant money that will impact the program's growth in the next five years. The $100,000 requested of the State Legislature for Fiscal Year 1977 is considered unusual by the EHA director because the Alabama Legislature is reluctant to impose any new taxes on the citizenry. However, state officials estimated that the new federal legislation could well cause the Alabama Legislature to double or possibly triple the state's allocation of funds to the solid waste management program in the next two years. Once the Alabama bill has been enacted by the Alabama Legislature, the state will be eligible for federal grant money, and the Alabama program may have approximately $300,000 in both state and federal money for solid/hazardous wastes management.

Principal statutory authority for the operation of Alabama's solid wastes management program rests with Act 771, the Solid Waste Disposal Act, passed in 1969. The Act authorizes the following:

1) To provide for the control and disposal of solid wastes as generated by the general public, businesses, institutions, and industry;

2) To authorize counties and municipalities to provide for the collection and disposal of solid wastes and charge a fee therefore;

3) To contract for such services to be performed by others;

4) To permit the formation of districts or areas beyond corporate limits, or cooperative joint or mutual agreements between county governments and municipal governments for the operation and implementation of solid wastes management in a manner meeting public health standards and granting authority for the establishment of rules and regulations to enforce the provisions of this Act; and

5) To provide a penalty for violating this Act, or rules or regulations pursuant thereto, in the interest of the public health, comfort and safety.

The Act was later amended in 1971 by Act 2247 "to provide the method of obtaining a certificate of exemption, to provide for the collection of fees, charges and rates for providing services, and to provide penalties..."

A draft form of the Alabama Hazardous Wastes Management Act of 1976 is summarized by the following: (substitute for S. 456)

> This bill empowers the State Board of Health to permit and regulate the transportation, treatment, disposal and other management of hazardous wastes, excluding radioactive wastes, and to purchase and lease a site or sites to dispose of such wastes. It makes an appropriation from the general fund in the state treasury to cover the capital outlay needed for the acquisition of a disposal site and also for the cost of administering this act.

The Act contains a proposal to establish a central disposal site in Alabama for the ultimate disposal of hazardous waste materials. The site is to become the property of the State of Alabama and contracts will be completed with waste processing firms such as Monsanto, Rollins and Du Pont for them to receive and process these materials on a fee basis. The generators of the materials will dispose of their hazardous wastes after making contractual arrangements with the operators of the disposal facilities. The state's role will be to ensure that the rules and regulations for the proper disposal of the materials will be followed.

The Division of Solid Waste and Vector Control will need to develop a manifest tracking system so that the state can follow the materials from the generator to the disposal facility. If large generators of hazardous wastes materials wish to operate their own disposal facilities, the Act allows them to do so, as long as the rules and regulations are properly followed. There are few safe disposal sites in northern Alabama as the soil consists of porous sandstone and limestone. In western Alabama, or the "calk lands", the land is impervious gumbo clay which is considered by state authorities to be the most suitable area for such a disposal site from a geological standpoint. A basic problem in deciding upon a site is that the state experiences a high annual rainfall of between 50 to 60 inches.

The Hazardous Wastes Management Act of 1976 is to accomplish the following provisions according to the draft form of the proposed Act:

1) To vest regulatory authority over hazardous waste management in the State Board of Health;
2) To authorize the Board to purchase, lease, and administer lands to be used as disposal sites for hazardous wastes;
3) To vest perpetual responsibility for such sites in the State of Alabama;
4) To establish the Hazardous Wastes Technical Advisory Committee;
5) To place certain responsibilities for hazardous waste management upon the Board of Health, generators of waste, transporters, and persons operating disposal treatment or disposal sites;
6) To require permits and operate treatment or disposal sites for hazardous wastes;
7) To require reporting of wastes generated by the generator as such;

8) To require the use of a manifest;

9) To provide for penalties and remedies;

10) To provide for administration and enforcement;

11) To declare violations to be a public nuisance per se;

12) To allow appeal to establish the Hazardous Wastes Management Fund and to make appropriations therefrom; and

13) To appropriate out of the general fund in the state treasury funds to initiate the program.

The Alabama Water Improvement Commission is also concerned with hazardous waste disposal and is currently inventoring those materials generated in Alabama through their Section 208 studies under P.L. 92-500. Their task is to determine who the generators of the hazardous wastes are in Alabama and what they do with it. Their efforts will provide supplementary information for the Board of Health activities.

B. Workforce Profile

The Division of Solid Waste and Vector Control of the Environmental Health Administration, is staffed with a total of five persons. The director, a federal employee, is an engineer. A secretary assist him in the administration of the program. Two environmentalists are employed full-time by the division; one is a sanitarian who is assigned to work on solid waste management matters. The other environmentalist is an entomologist by profession; this person works on vector control matters. An instructor is also on the division's staff to demonstrate compacting to heavy equipment operators at sanitary landfills. Fifty percent of the instructor's salary is paid for by state funds and the other fifty percent by federal funds.

The Jefferson County Health Department's Division of Sanitary Engineering employs two public health engineers and ten sanitarians who have solid waste management functions as a part of their responsibilities. The total solid waste management workforce is estimated to be approximately 250 persons, including state and county employees. Most of the county employees are environmentalists or sanitarians and are employed by county health departments. Many have additional duties besides those of solid waste management activities. Workforce figures detailing general collection and disposal activities were not available at the time the research for this study was conducted.

C. Workforce Projections

The director of the Environmental Health Administration projected that the new federal and state hazardous waste management legislation could possibly double or triple the state's solid waste management program's staffing level by 1982. The Division of Solid Waste and Vector Control is likely to recruit additional chemical engineers, environmentalists, secretaries and clerks to implement state and federal mandates. Environmentalists are likely to be assigned as inspectors to visit plants that generate hazardous waste materials and inspect their operations. Engineers would be assigned to visit the plants to determine what types of wastes are being produced and to determine whether or not the materials generated should be classified as hazardous and how they shall be handled. Additional secretaries and clerks would be hired to maintain the manifest system needed to ensure that the materials are being properly disposed of; a process which will involve considerable additional record-keeping. The Division will not require additional laboratory analytical work to be performed by private industry. The local programs are not anticipated to have a considerable increase in staff in the next five years as a result of the new federal and state legislation. For example, the Jefferson County Division of Sanitary Engineering's solid waste management effort is only expected to recruit one senior sanitarian in the next five year period, according to Mr. Paul Pate, director of the Jefferson County Bureau of Environmental Health. Only a portion of this person's time would be devoted to solid waste management activities.

D. Training and Certification

According to the director of the Environmental Health Administration, the Division's employees receive training from formal internal programs. The Division of Solid Waste and Vector Control, one of the Administration's Divisions, may send personnel such as environmentalists for out of the state advanced degree work. Engineers, environmentalists, sanitarians, and radiation physicists are examples of the types of personnel that receive long term training at outside universities. Environmental Health Administration personnel also occasionally attend short courses offered by the University of Alabama and Auburn University.

Troy State University conducts an internship program with county health departments in the environmental sciences and the program is geared toward Environmental Health Administration needs, but few environmental graduates are graduating from Troy State at the present time. The Environmental Health Administration actively works with Troy State University to assist in designing its curriculum to meet Environmental Health Administration needs. Troy State University graduates between four to six persons per year from their environmental sciences program and most leave to work with the State of Alabama, although a few have gone to work in Florida.

E. Career Potential

Environmental Health Administration officials anticipate that chemical engineers and sanitarians have the best career potential in Alabama's solid waste management program in the next five year period. Persons with private industry experience in techniques of hazardous waste disposal might have an advantage in obtaining employment in the new state hazardous wastes management program. Companies such as Du Pont, Monsanto and Rollins which may receive the state contract to operate the wastes disposal sites, may have additional workforce needs as a result of the new federal and state legislation. State officials were unable to identify any new or unique careers arising in the field of solid waste management in the next five years, other than those associated with hazardous waste management.

F. Conclusion

The Division of Solid Waste and Vector Control is one of the few Alabama pollution control and abatement programs expected to have any growth over the next five years. This growth will be direct consequence of the new Resource Conservation and Recovery Act's program to provide grants to states to develop disposal plans. During the previous legislative session, the Alabama Legislature had before it a similar hazardous waste management act which was not enacted. The Act was included as part of the Department of Public Health's legislative proposal and it was very similar to the recent federal Act. The State of Alabama was ready to proceed on the hazardous wastes problems because the need for it was already perceived. Consequently, passage of the federal hazardous wastes management legislation is likely to compel the Alabama Legislature to enact the State Department's of Public Health's legislative proposal during this present session. Private industry also realized that such legislation was imminent and their attitude toward cooperating with the State of Alabama to deal with the program was very favorable. Thus, the State of Alabama may be one of the first states in the nation to take direct steps to deal with the problem of disposing of hazardous wastes materials.

VII. WASTEWATER

A. Introduction

The Alabama Water Improvement Commission (AWIC) exercises principal program responsibilities for Alabama's wastewater pollution control and abatement activities. Legislative authority was provided through the State's Water Pollution Control Law (Act 1260), enacted during the Alabama Legislature's regular annual session of 1971. The Act prescribes the commission's jurisdiction, powers and duties and provides for enforcement of the commission's rules and regulations. The commission is composed of five voting members appointed by the Governor and two non-voting members. The five voting members include an attorney, a physician, a registered professional engineer and two Alabama residents who possess no special expertise. The State Health Officer of the Alabama Department of Public Health serves as the commission's Chairman and the Director of the Department of Conservation serves as the vice-chairman. The Director of the Environmental Health Administration of the Department of Public Health serves as the commission's technical secretary and is responsible for coordination of the commission's and the administration's activities. A three-member Technical Advisory Committee composed of the Commissioner of Agriculture and Industries, the Director of the Department of Conservation, the Director of the Alabama Development Office and the state geologist was also created through the enactment of Act 1260. A chief administrative officer is appointed by the AWIC to direct the commission's technical staff. This official is to manage the implementation of the programs mandated by federal and state wastewater pollution control laws.

A second state law, Act 1594, created a Board of Certification to provide for a mandatory certification program for wastewater treatment plant operator and asked the AWIC to provide support. Certification examinations are administered by the Board of Certification and certificates are granted after passing a written examination. The examinations are given usually twice a year at an annual Short Course School and at selected locations decided upon by the board. The certificates indicate the classification of facilities that operators are qualified to operate. Consideration is being given by the board to adopt regulations to include certification of operators of industrial facilities, as well as operators of waste treatment facilities serving semi-public and private facilities.

During Fiscal Year 1976, the commission completed and began operation of its first field office in Birmingham and hopes to establish a second field office in Mobile by mid-FY '77. Construction grant activities received priority in the commission's program during FY '76 and these activities are again expected to receive priority in FY '77. The rapid processing of grant applications is another priority to which the AWIC has committed themselves during FY '77 as the commission fell slightly behind in its anticipated numbers of grants by types during FY '76. The AWIC has also contacted the EPA Region IV Office for assumption of NPDES permitting authority. A revised proposal for new water quality standards is now being reviewed by the Region IV office of the U.S. Environmental Protection Agency. According to the commission's "Program Submission 106 for F.Y. 1977", the following areas have been identified for resolution in order for a program implementation agreement to be worked out between the state and EPA:

1) Permitting of surface mining activities;
2) Permit reissuance, to include the possible use of class permits;
3) Monitoring requirements, to include the possible use of class permits;
4) Commission action in permit approvals;
5) Enforcement activities and resources;
6) Compatibility of permits and construction grant activities.

The Alabama Water Improvement Commission, under Alabama law, is charged with the technical review of plans and specifications relating to the construction of waste treatment facilities. The commission has proposed a comprehensive management approach to EPA leaving administrative review of the program to EPA while assuming full responsibility for O & M review, interim inspections, and other technical matters. The commission also has proposed a similar approach for the review of change orders, i.e., leaving administrative responsibilities to EPA.

The commission also questions the validity and reliability of data produced by the self-monitoring requirements for municipal permit holders under the NPDES program. The commission has been suggesting to Alabama's municipalities that they investigate various possibilities for meeting the monitoring requirement, to include the concept of creating regional laboratories under such an arrangement, one municipality would provide laboratory services for others surrounding it and using municipalities would pay on a fee basis.

A monitoring strategy is being implemented by the AWIC to continue monitoring at its trend stations. According to the "Program Submission 106 for F.Y. 1977", the AWIC operates 63 trend stations in 19 river basins with or without flow data. Flow data are currently available for 38 of these trend stations. A total of 28 biological trend stations in 10 river basins are operated with 14 involving fish samples and 14 involving micro-vertegrate samples. A total of 59 ambient trend stations are also operated by the AWIC.

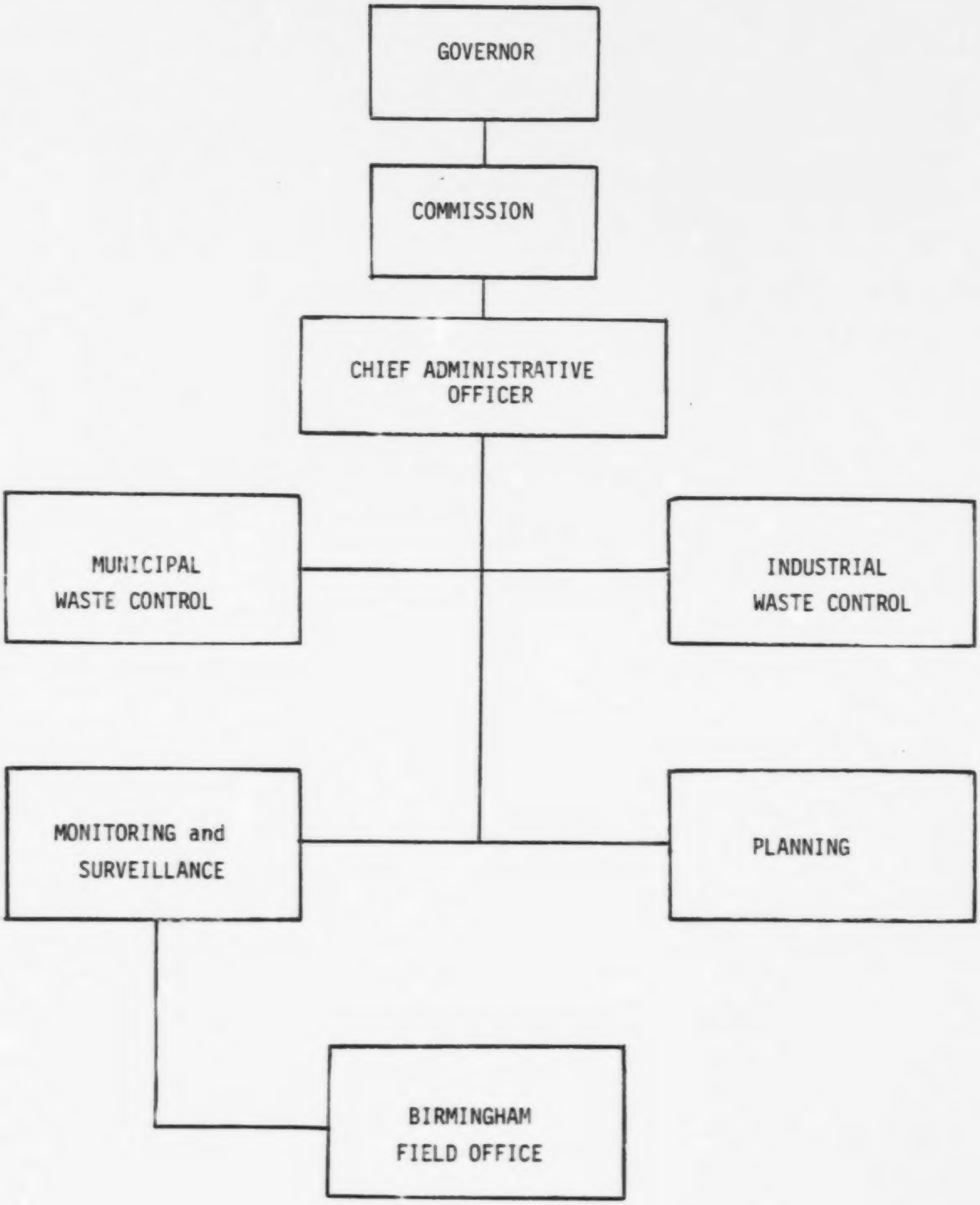
Alabama has 182 "Major Municipal Dischargers" under NPDES permitting authority according to "Program Submission 106" information. Forty-three of the major municipal dischargers are in compliance with EPA Water Quality Standards while 139 are not in compliance. However, according to the Alabama Water Quality Standards, 130 are currently in compliance while 52 are not.

Alabama also has 169 major non-municipal dischargers of which 71 are in compliance with EPA Water Quality Standards and 75 are in compliance with State Water Quality Standards as of March 12, 1976. According to the Report's Construction Grants Project List for 1977, Alabama has a total of 362 facilities with projected needs. Total EPA assistance required is over $162 million. The report indicated that 72 facilities are in the Step I phase of the program, 169 are in Step II and 121 are in Step III phases of completion.

In addition to the NPDES program, the Alabama Water Improvement Commission also wishes to assume program responsibility for small business loans, and other parts of the construction grants program since the commission currently reviews plans and specifications on all projects discharging into Alabama's waters and now handles "in-furtherance" certification of water pollution control projects.

ALABAMA WATER IMPROVEMENT COMMISSION

Figure 4


GOVERNOR
COMMISSION
CHIEF ADMINISTRATIVE OFFICER
MUNICIPAL WASTE CONTROL
INDUSTRIAL WASTE CONTROL
MONITORING and SURVEILLANCE
PLANNING
BIRMINGHAM FIELD OFFICE

Strip mining activities in the northern part of Alabama have dramatically increased since 1974. The Alabama Legislature adopted Surface Mining Regulations in 1975 and established a Surface Mining Reclamation Commission. The Alabama Water Improvement Commission has jurisdiction over the water quality aspects of strip mining and has added a permitting and identification of discharges program to its activities.

B. Workforce Profile

Administration of the commission's technical staff is charged to a chief administrative officer who is classified under the state merit system as a Water Quality Control Engineer. The total staff of the Alabama Water Improvement Commission at the present time (1976) is comprised of 63 persons and 19 vacant positions which are authorized to the commission by the Legislature. The total includes the Birmingham Field Office which just became operational during Fiscal Year 1976. Of the 63 employees, 41 have professional positions and 22 persons have clerical or temporary positions. The chief administrative officer receives administrative support assistance from an attorney, a legal research aid, an accountant, a switchboard operator, an administrator and two clerks. Four sections under the chief administrative officer provide the following abbreviated functions:

1) Industrial Waste Control Section: Reviews plans and specifications for upgrading of industrial wastewater construction plants. Conducts inspections of these facilities to determine their operational status. Develops a list of major industrial dischargers. Reviews plans and specifications for treatment facilities which discharge to the sewers of Alabama's municipalities. Reviews NPDES permits, drafts state permits, assists in monitoring studies and responds to citizen complaints. Regulates the water quality aspects of strip mining.

2) Municipal Waste Control Section: Provides technical services to municipalities, institutions and commercial enterprises on sewage treatment and disposal problems. Reviews engineering reports, plans and proposals for domestic waste treatment facilities. Inspects completed projects, performs routine inspections, develops waste and stream monitoring programs and determines compliance by municipalities and others discharging sewage with water quality standards and requirements of the Commission. Provides state efforts in association with construction grant activities.

3) Monitoring and Surveillance Section: Plans and performs basic laboratory monitoring of the quality of the state's waters. Reviews applications for permits from federal agencies and provides certifications required under Section 401, Public Law 92-500.

4) Water Quality Management Section: Responsible for the execution of water quality management planning (Phase I basin plans and statewide 208 Planning), water quality standards, non-point source programs, and automatic data-handling systems. Involved in 208 Planning in designated areas and reviewing and approval of 201 facility plans.

The Alabama Water Improvement Commission, headquartered in Montgomery, is integrated into the program activities of other state pollution control and abatement regulatory agencies. Laboratory analytical work is performed by the Environmental Health Administration Laboratory and financial and payroll services are provided by the Alabama Department of Public Health. A full-time attorney was assigned to the commission by the Environmental Protection Division of the Alabama Attorney General's Office. The commission also assists the Division of Radiological Health, a part of the Environmental Health Administration, in the collection of water samples for radiological analysis purposes. The commission further assists the Board of Certification for Water and Wastewater Plant Operators in preparing and conducting examinations and in investigating and evaluating plant performance and is required by Alabama law to coordinate location of landfills to avoid water pollution problems.

The Alabama Water Improvement Commission's technical staff located at the central office in Montgomery and at the Birmingham field office together account for a total of 29 professionals and 29 clerical, technician and administrative positions involved in wastewater pollution control activities in 1976. The total of 63 positions includes approximately 9 student aides employed through a cooperative arrangement with Alabama's universities and colleges on a rotational basis. Engineers predominate in Alabama's wastewater pollution control and abatement program.

The following table depicts the total number of personnel employed by the Alabama Water Improvement Commission in 1976, both in Montgomery and in the field office at Birmingham.

TABLE XV

ALABAMA WATER IMPROVEMENT COMMISSION

Wastewater Pollution Control Program Personnel
Current (1976) Staffing Level

Position	1976
Engineer	20
Attorney	1
Biologist	6
Chemist	1
Scientist	6
Technician	11
Other	18
TOTAL	63

The preceding table does not include 19 vacancies which the commission cannot financially support in its budget but which are authorized for it. Engineers employed by the commission are classified in Alabama as public health engineers. The total of 20 engineer positions depicted in Table XV also includes the chief administrative officer who is classified as a water quality control engineer. Most of the engineering personnel employed by the commission have a civil or chemical engineering educational background and are hired to perform sanitary engineering duties. Most of the engineers currently employed by the commission have bachelor degrees,but many are sent at state expense to receive graduate education (M.S.), in sanitary engineering. To advance in state service in Alabama, the employee,at some point in his career development, must obtain a master's degree and be a registered professional engineer. Chemists employed by the State of Alabama must have both a degree in chemical engineering or chemistry and possess experience performing chemical analysis. Water pollution control biologists, according to the state merit system, are required to have bachelor's degrees in biology with coursework in organic and inorganic chemistry with subsequent requirements for an M.S. in higher level positions.

Of the six positions included in the "scientist" classification in Table XV, all are classified as pollution control specialists, who have bachelor's degrees in science fields such as biology, chemistry or geology. Four of the six pollution control specialists have been assigned to the Industrial Waste Control Section to investigate strip mining operations of coal in the northern part of Alabama.*

One of the positions included in the "technician" category in Table XV is classified as an environmental health specialist. A person employed in this position must be a high school graduate and must have taken advanced mathematics courses. The ten student aides are also included in the "technician" classification. They are assigned to duties such as collecting water samples and transporting them to laboratories for analysis.

*The other two assist in the Municipal Waste Control effort.

The "other" positions referred to in Table XV include an attorney, a legal research aide, an accountant, a health services administrator, a federal grants project analyst, a resource planner, an information systems specialist, an administrative trainee, an illustrator, a switchboard operator and eight clerk-stenographers.

In Fiscal Year 1977, water quality management planning, water quality standards review, and non-point source programs are all to be accomplished under the State of Alabama's Continuing Planning Process (CPP) which was established through an agreement with the U.S. Environmental Protection Agency pursuant to Sections 208 and 303e of PL 92-500. The commission has been designated under the agreement as the State Planning Agency responsible for the achievement of the Alabama water quality management program goals. Three local areawide planning agencies have been designated under the 208 water quality management program. These include the Birmingham Regional Planning Commission, the South Alabama Regional Planning Commission in Mobile and the West Alabama Planning and Development Council in Tuscaloosa County. These three local planning agencies are responsible for the 208 Planning for seven agencies. They employ ten full-time people for their planning activities. The target dates for completion of planning processes are April, 1978, for the Birmingham and Mobile programs and September, 1977, for the Tuscaloosa program.

Wastewater treatment plant operators in Alabama are certified according to the size and the type of treatment plants they are responsible for operating. For example, a Grade I operator operates primary and lagoon type plants, whereas Grades II, III and IV operators operate trickling filter and activated sludge type plants. Treatment plants

Grade I and II require an operator at least equal to the facility grade. Grades III and IV treatment plants require an operator to be certified at least one grade below the facility grade provided that an operator certified at least equal to the facility grade is on call and could normally be on site within 30 minutes. The following table depicts the current distribution of certified waste treatment plant operators by grade classification as of February 4, 1977.

TABLE XVI

STATE OF ALABAMA

Certified Wastewater Treatment Plant Operators
Current (1976) Staffing Level

Classification		1976
I		163
II		145
III		171
IV		175
	TOTAL	654

Alabama Water Improvement Commission officials estimated that the current total number of persons employed in the field of wastewater pollution control and abatement in Alabama is approximately 1,300. This total includes the public and private sectors. The public sector total includes the AWIC and the local 208 Planning agencies and the private sector figures include certified treatment plant operators, non-certified operators such as trainees, consultants and engineers employed by industry in Alabama.

C. Workforce Projections

Workforce projections for the Alabama Water Improvement Commission for the next five-year period are based on professional judgements of its administrative officials. A portion of the FY '77 budget proposed to EPA and the state legislature is expected to be utilized in filling some of the authorized but currently vacant positions. According to the commission's "Program Submission 106 for F.Y. 1977", positions planned to be filled include four engineers, one biologist, two chemists and two pollution control specialists. As of February, 1977, commission sources indicated that one chemist, one engineer, one attorney and two secretaries have already been added to their staff.

The commission experiences an average annual turnover rate of between twenty to twenty-five percent which translates to between twelve to fifteen positions lost through employee turnover. Official sources stated that most of the employee turnover is among engineers, pollution control specialists, systems analysts, clerks and student aides, and is usually attributed to low salary and lack of advancement opportunity.

Few new federal programs are anticipated to be added to the commission's program over the next five year period, and the legislature is considered not amenable to authorizing funding for sizable staffing increases. Staff growth rate under such conditions is projected to average about seven percent or about three to four positions annually added to the staff. Recruitment emphasis is likely to be placed upon hiring additional engineers and biologists. A principal reason for the skepticism among commission officials concerning major staffing increases over the next five-year period arises from the seven and one half percent cut in the Public Health budget imposed between 1975 and 1976 by the legislature.

As pointed out earlier, officials consider the Alabama Legislature to be fiscally conservative and unwilling to increase the state's tax base. The following table depicts possible staffing increases for the Alabama Water Improvement Commission over the next five year period, based on the professional judgment of its administrative personnel.

TABLE XVII

STATE OF ALABAMA

Wastewater Program Operations
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	20	22	23	24	25	26	n/a	5%
Attorney	1	2	2	2	2	2	n/a	20%
Biologist	6	7	8	9	10	11	n/a	13%
Chemist	1	2	2	3	3	3	n/a	30%
Scientist	6	7	8	9	11	12	n/a	15%
Technician	11	11	11	11	11	11	n/a	0
Other	18	19	22	23	24	25	n/a	7%
TOTAL	63	70	76	81	86	90	22%	7%

The above table depicts what Water Improvement Commission sources project to be the agency's workforce needs over the next five-year period. They could not project with any degree of assurance what the legislature will finally approve. There is a possibility that the only positions that the commission will receive budgetary support for in the next five year period will be replacements for personnel lost through employee turnover. State sources also indicated that the commission may be reorganized due to proposals which will be considered by the Alabama Legislature in its 1977 regular session. The reorganization proposal has the support of the Alabama Governor, and there is some possibility that the measure will be approved. A second field office may be established in 1977 or 1978 in Mobile if the Alabama Legislature approves funds to support the commission's request in it's Fiscal Year 1977 budget.

Alabama Water Improvement Commission sources indicated that the number of certified wastewater treatment plant operators will possibly increase by 50 percent by 1982. The principal reason for such growth is due to the fact that more facilities will be operational and others will be upgraded through the construction grants program. Grade I plants, which include existing primary plants and nonaerated lagoons will receive attention, with primary plants to be phased out or upgraded. Nonaerated lagoons are expected to be maintained as treatment systems. Professionals project that the total number of Grade I plant operators will decline by ten percent as many of the primary plants are phased out. The total number of Grade II (trickling filter 1.0 MGD or less activated sludge 0.5 MGD or less) treatment plant operators is anticipated to increase by approximately twenty percent by 1982. The largest increase of plant operators (40 percent) is expected to be of the Grade III classification (trickling filter 1.0 MGD through 10.0 MGD/activated sludge 0.5 MGD through 5.0 MGD). No significant increase in the number of Grade IV treatment plant operators (trickling filter above 10.0 MGD/activated sludge above 5.0 MGD) is expected in the next five years. It is worthy of note that Jefferson County (Birmingham), which has many Grade III treatment plants, requires that supervisors must be certified as a Grade IV operator before they are allowed to operate a Grade III facility. The following table represents what commission representatives project the workforce for certified wastewater treatment plant operators to be by 1982.

TABLE XVIII

STATE OF ALABAMA

Wastewater Treatment Plant Operators
Workforce Projections to 1982 (est.)

Classification	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
I	163	160	157	154	151	147	n/a	-2%
II	145	151	157	163	169	174	n/a	4%
III	171	185	199	213	236	240	n/a	7%
IV	175	175	175	175	175	175	n/a	0%
TOTAL	654	671	688	705	731	736		2%

D. Training and Certification

All Alabama Water Improvement Commission personnel receive training on the job which involves a work assignemtn with an experienced staff member until such time as the new recruit demonstrates sufficient competency to work independently. Staff members also attend, at state expense, short courses conducted by EPA. The Industrial Waste Control Section's staff is sent to EPA technology transfer seminars at Cincinnati's National Training Center, whenever industrial waste pollution subjects of concern are addressed. According to total Fiscal Year tabulations for 1976, Alabama sent 12 persons to National Training Center courses.

Engineers and technical personnel from the Industrial Waste Control Section are sent to at least two seminars each year. The seminars range from the Purdue Industrial Waste Conference to continuing education courses sponsored by local universities and EPA technology transfer sessions and courses. All personnel are required to keep an experience list of training courses and seminars attended.

In the opinion of Alabama Water Improvement Commission sources, engineering personnel with a basic bachelor degree education do not possess sufficient knowledge of wastewater pollution control and abatement techniques upon graduation. These sources indicate that an advanced degree in such fields as sanitary engineering or aquatic biology is required. Most chemical engineers also do not currently receive any waste treatment instruction during their undergraduate training.

The Alabama Water Improvement Commission usually sends at least one staff engineer or biologist back to school for an advanced degree each year. Personnel are usually selected from the Industrial Waste Control Section, the Municipal Waste Control Section and the Water Quality Management Section on a rotational basis. Staff professionals receive full salary, an educational leave of absence (limited to one year), tuition and travel expenses to and from the educational institution. Such advanced training is considered necessary for the upgrading of the commission's staff technical skills. Personnel, after attending such long-term training programs, usually receive promotional considerations upon return. Engineers and biologists are usually sent for Master's Degrees in an appropriate field at such educational institutions as Purdue, Harvard, Clemson, the University of Florida, Vanderbilt, Georgia Tech, Mississippi State, the University of Michigan and the University of Texas. Biologists are sent to the University of Florida or Iowa State University for Master's Degrees in Aquatic Biology. Personnel also attend resource management and computer systems courses offered by Clemson.

Many of the commission's current engineering staff are graduates from Auburn University's engineering program and more applications for employment are received each year from Auburn University engineering graduates than from any other educational institution. Commission officials hold both the University of Alabama's and Auburn University's undergraduate engineering programs in high regard.

Training for wastewater treatment plant operators and water plant operators is conducted jointly during an annual Short Course School sponsored by the Alabama Water and Pollution Control Association (re: report IV: Potable Water for Alabama). Instruction is also given by the State Department of Education's Post-Secondary and Continuing Education Division. The Alabama Water Improvement Commission actively supports the Department of Education's operator training program, and, the commission is represented on the Operator Training Advisory Committee. One full-time instructor has been employed by the Department of Education to provide operator training across the state with assistance provided by local officials. The courses are taught on a rotational basis at selected sites across the state and the courses are designed to last approximately one week. They begin with basic mathematical instruction and progressively lead to more specific subjects such as laboratory control and plant operations. The commission provides input by formulating the material to be presented and coordinating the program with local officials. No tuition is charged to the operators attending the classes, and each class is usually attended by between fifteen to twenty persons. The Alabama Water Improvement Commission's "Program Submission 106 for FY 1977" tabulated the number of students attending the program during

Fiscal Year 1975 and included estimates of those expected to attend during Fiscal Years 1976 and 1977.

TABLE XIX

STATE OF ALABAMA

Department of Education Operator Training Programs (est.)

Fiscal Year	# Basic Classes	Atten.	# Adv. Classes	Atten.	Total Classes	Total Atten.
1975	23	405	21	346	44	751
1976	24	357	24	348	48	705
1977	23	350	23	350	46	700

E. Career Potential

According to commission officials, the potential for employment in any new areas with the Alabama Water Improvement Commission in the next five years is not very promising at the present time. No new careers were identified by Alabama program officials in the field of wastewater pollution control and abatement and personnel actually recruited over the next five years will be of the same types that presently staff the commission's technical program. An Alabama resident seeking employment with the AWIC is likely to receive extra consideration in terms of employment, since AWIC cannot affort to provide continuous training for professional staff and emphasizes hiring candidates who are felt less likely to move or change jobs.

F. Conclusion

Although the Alabama Water Improvement Commission expects to take over the NPDES permitting program and other elements of the construction grants program from EPA during FY 2977, commission officials do not anticipate sizable staff increases in the next five-year period. The commission experiences a relatively high average annual turnover rate because of engineers and younger staff changing jobs or being recruited by the private sector. Based on past history, the Alabama Legislature is considered unlikely to provide financial support for major staffing increases. Most growth will likely involve filling positions that are currently authorized, but for which funds have not been allocated.

VIII. ENERGY

A. Introduction

The State of Alabama has two energy-related organizations. One is the Alabama Energy Advisory Council in Birmingham which was set up under the Governor's enabling authority to conduct comprehensive, in-depth studies which identify demand trends and supply potentials for all forms of energy. It was also created to reconcile environmental quality requirements with energy needs, to study incentives necessary for resource development and to make recommendations to the Governor on the most effective use of the state's energy resources. The Council membership is currently twelve persons appointed by the Governor. The other Alabama energy-related agency is the Alabama Energy Management Board, created by an Executive Order of the Governor on November 8, 1973, to advise the Governor on energy matters and to develop an equitable distribution of energy supplies in Alabama. Other responsibilities of this Board include:

1) Prepare the necessary studies of the sources of energy available to the State of Alabama;

2) Prepare plans and programs for the conservation of all available energy;

3) Prepare plans and procedures for the implementation of all state and federal laws, rules and regulations pertaining to energy resources, supplies and distribution and recommend to the Governor such plans and programs as may be necessary for implementation.

The Alabama Energy Management Board is presently made up of seven Board members and had a total 1975 budget of $120,000. Major programs include fuel allocation, natural gas curtailment and energy conservation.

The Tennessee Valley Authority's Brown's Ferry nuclear power plant is the largest in the world and recently reached full capacity of almost 3.3 million killowatts in January, 1977. The three-reactor nuclear power plant is the largest generating plant of the seven-state TVA power system. According to an Associated Press news article appearing in the Atlanta journal on January 19, 1977, the Brown's Ferry plant has been estimated to be generating about fifteen percent of the total power generated by the TVA system during the first three weeks of January, 1977, when the region was experiencing unusually cold weather. The Tennessee Valley Authority is now constructing two 1,213-megawatt reactors near Scottsboro, and the first of these is to become operational in 1980.

The TVA Radiological Hygiene Branch and Air Quality Branch staff are located at Muscle Shoals in Alabama. The Radiological Hygiene Branch staff conduct environmental radioactivity monitoring at TVA's nuclear power sites and provide health physicists for the sites. The Branch also maintains a radioanalytical laboratory and dosimetry facilities to analyze environmental samples and to evaluate personnel radiation exposures. Staff develop radiological hygiene standards and procedures for use at planned and operating nuclear sites and evaluate plans for nuclear facilities.

Alabama Power Company operates two nuclear power reactors in Dothan, Alabama. The two reactors are Joseph M. Farley Units and have a total capacity of 1,658,000 killowatts. The first of these plants is scheduled to begin commercial operation in 1977. Alabama Power has also recently ordered four 1,170 megawatt units for the Barton Plant at Verbena. Alabama Power's environmental response capabilities are centered in its Division of Environmental and Technical Services which are headquartered in

Birmingham. Division personnel stated that the company has run an austerity program in the last three years and all operations not directly related to plant operations have been eliminated.

B. Workforce Profile

The Alabama Energy Management Board is headed by a staff director, Mr. Edwin G. Hudspeth. Mr. Hudspeth oversees three clerks and a secretary and there are no professionals on his staff. The clerks are actually paraprofessionals and they are considered by Mr. Hudspeth to be expert in case resolution. The Board's staff has undergone dramatic decreases in staffing level since 1974, when twenty-six persons were employed by the Board following the energy crisis after the Arab embargo.

The Tennessee Valley Authority's Radiological Hygiene Branch and Air Quality Branch of the Division of Environmental Planning are both headquartered in Muscle Shoals, Alabama. Both Branches employ a total of 234 persons to control and abate environmental pollution for the TVA facilities. The current (1976) staffing levels for these two Branches are as follows.

TABLE XX

TENNESSEE VALLEY AUTHORITY

Division of Environmental Planning
Air Quality Branch
Current (1976) Staffing Level

Position	1976
Degreed:	
Engineer	8
Meteorologist	13
Chemist	17
Physicist	5
Business	5
Other	46
College, no degree	35
No College	38
Associate Degree	1
TOTAL	168

TABLE XXI

TENNESSEE VALLEY AUTHORITY

Division of Environmental Planning
Radiological Hygiene Branch
Current (1976) Staffing Level

Position	1976
Nuclear Engineer	5
Safety Engineer	1
Chemist	8
Physicist	9
Radiological Health	1
Health Physicist	2
Other Degree	8
Associate Degree	1
Some College	14
Radiological Technician	1
High School Degree	16
TOTAL	66

TVA sources estimated that each nuclear power plant operated by the Authority has five health physicist technicians and two health physicists on staff. There are three nuclear power plant units currently in operation at Dothan, so there are an estimated fifteen health physicist technicians and six health physicists working at the plants at Dothan, at present. TVA's total environmental pollution control and abatement staff in Alabama is currently estimated at 255 persons.

Alabama Power Company's Division of Environmental and Technical Services currently employs a total of 32 persons. The Division is composed of the Division Manager, 23 professionals, and eight clerical and support personnel. The Division of Environmental and Technical Services is composed of three basic sections which include:

1) Computer Services Section: Provides computer services to the Division. Composed of two systems analysts and one co-op student.

2) Environmental and Technical Studies Section: Composed of an Analytical Studies and Environmental Reports Group, a Siting, Research Administration and Regulation and Treatment Development Group, and a Biological Studies Group.

3) Permits and Environmental Surveillance Section: Composed of an Air Permitting and Surveillance Group, a Water Permitting Group and a Water Surveillance Group.

The Analytical Studies and Environmental Reports Group perform air, water and energy studies and are in charge of civil and mechanical engineering functions of the Alabama Power Company. The Siting, Research Administration, Regulation and Treatment Development Group performs special studies for the Company. The Biological Studies Group is responsible for the performance of biological aquatic studies and the persons involved in the performance of such tasks are stationed at power plants which are located on rivers in Alabama. The following table depicts current workforce staffing levels for pollution control and abatement personnel of Alabama Power Company:

TABLE XXII

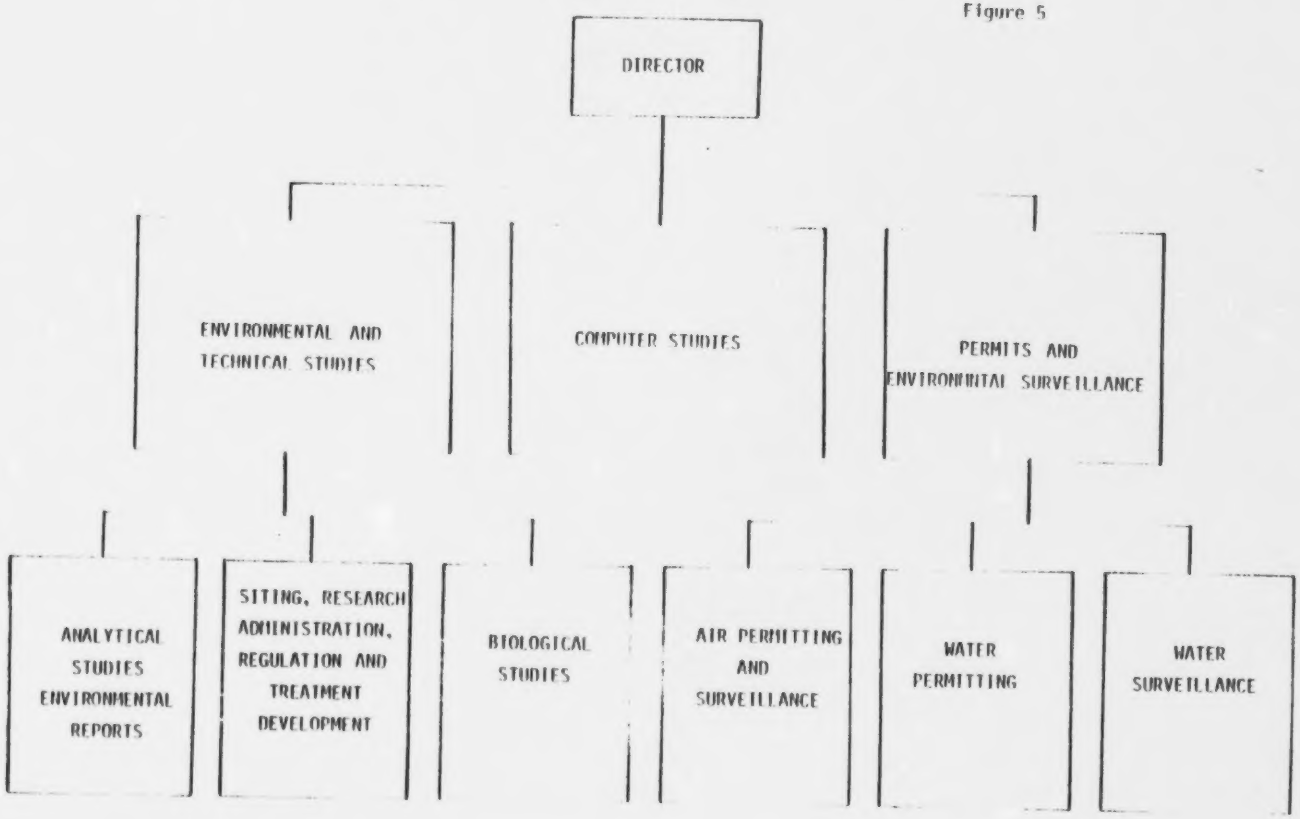
ALABAMA POWER COMPANY

Division of Environmental and Technical Services
Current (1976) Staffing Level

Position	1976
Engineer	8
Engineering Specialist	1
Biologist	6
Chemist	8
Systems Analyst	2
Engineering Aide	2
Draftsman	1
Co-op Student	2
Secretary	2
Manager	1
TOTAL	33

ENVIRONMENTAL and TECHNICAL SERVICES
ALABAMA POWER COMPANY

Figure 5


DIRECTOR
ENVIRONMENTAL AND TECHNICAL STUDIES
COMPUTER STUDIES
PERMITS AND ENVIRONMENTAL SURVEILLANCE
ANALYTICAL STUDIES ENVIRONMENTAL REPORTS
SITING, RESEARCH ADMINISTRATION, REGULATION AND TREATMENT DEVELOPMENT
BIOLOGICAL STUDIES
AIR PERMITTING AND SURVEILLANCE
WATER PERMITTING
WATER SURVEILLANCE

C. Workforce Projections

The Staff Director of the Alabama Energy Management Board is not confident that his present staff will increase in size over the next five year period. If funds are available, Mr. Hudspeth would like to recruit an industrial engineer, a statistician and an economist by 1982. Three professional engineers and a data management specialist would be utilized to perform special studies for the Board.

Tennessee Valley Authority officials project a 31 percent per year rate of growth for the Radiological Hygiene Branch over the next five years as more and more TVA nuclear power plants become operational. The Branch is expected to increase in staff from the present level of 66 positions at the present time to 237 positions by the end of 1981. Most of the growth will be centered among the nuclear engineering positions. The Radiological Hygiene Branch experiences an annual rate of turnover of about eight percent.

Alabama Power Company officials expect to be conducting more monitoring activities over the next five years as NPDES permits have now been issued for most of Alabama Power's plants. New hazardous waste legislation is not anticipated to affect Alabama Power Company's operations. Mr. Miller, head of the Environmental and Technical Studies Section, stated that the Division of Environmental and Technical Services personnel closely monitor the Federal Clean Air Act to anticipate any future directions that EPA may take in the control and abatement of air pollution. Division officials expect Congress to eventually pass Amendments to the Clean Air Act and Alabama Power Company has been responsive in assisting the State of Alabama's air program in achieving the goals of the State Implementation Plan.

D. Training and Certification

Alabama Energy Management Board staff do not participate in any training programs at the present time. For specific training and certification programs participated in by Tennessee Valley Authority environmental pollution abatement and control personnel, refer to the TVA section of the Tennessee report.

Alabama Power Company officials are pleased with the competence and quality of training courses offered by the U.S. Environmental Protection Agency. The courses conducted by the EPA Air Pollution Training Institute are considered to be of high quality by Division of Environmental and Technical Services personnel and courses offered are closely monitored. Alabama's two major universities, the University of Alabama and Auburn University are considered to have excellent engineering programs and the Company receives most of its outside training from these two universities. Most of the Company's biologists are recruited from Auburn University's Fisheries and Biology School. Engineering personnel are sent to short courses offered by Auburn University's extension center. The Birmingham branch of the University of Alabama offers accredited engineering courses that are much longer in duration than the extension center's, and they are well attended. Alabama Power Company pays tuition and expenses if Company employees attend courses that are job-related and offered by either of these two universities. Division personnel generally attend night classes and usually are sent for courses offered in the day if they only last between two to three days. Alabama Power Company primarily hires mechanical or civil engineers as they have found that most universities do not offer specialities in environmental areas. Power Company engineers develop expertise in specialized environmental areas through short courses offered by the extension center or through on-the-job experience. Company sources expect a new engineer to become functionally proficient after about one year's experience with the company.

The following types of courses were felt by Alabama Power Company sources to be of special benefit to the Division of Environmental and Technical Services in upgrading personnel technical skills over the next five years:

1) Courses felt to be directly applicable to the Environmental and Technical Studies Section's special studies activities:
    a) Air Dispersion Modeling
    b) Air Pollution Meteorology
    c) Water Quality Modeling
    d) Thermal Plume Modeling
    e) Cooling Pond Modeling
2) Courses or special studies directly applicable to the work of the Permits and Environmental Surveillance Section:
    a) Ambient Air Maintenance and Calibration Procedures
    b) Stack Monitoring Maintenance and Calibration Procedures
    c) Quality Control of Data
    d) Sampling Techniques
    e) Inspection of Wastewater Treatment and Facilities

E. Career Potential

New careers or potential for growth in staffing levels of the Alabama Energy Management Board may result from increased federal grant money being allocated for planning, energy conversion and conservation activities in the next five years because of the growing energy problem. Alabama Power Company officials do not anticipate any new careers in pollution abatement and control as it relates to energy production. Alabama Power Company does not retain any consultants for environmental work as Division officials consider their current organization to be capable of handling any environmental problem that may arise.

F. Conclusion

The Energy Management Board and Energy Advisory Council represent the two state bodies principally concerned with energy matters in Alabama. The Council was established to assess demand trends and supply potential for all forms of energy and to reconcile environmental matters associated with energy source development and production. The major activities of the Board include fuel allocation, natural gas supply and energy conservation. While both offices have heavy work loads, neither is expected to experience any substantial growth over the next five years. Alabama will likely respond to office and program development in terms of future federal energy policy.

Nuclear power facilities, e.g., utilities and TVA, located in Alabama will have an increasingly important role in the state's environmental strategies as programs to ensure safety from radioactive materials will require regular monitoring and inspection activities. The majority of the effort will be handled by federal and utility staff; however, the state may be obliged to add a minimal number of people with training in nuclear engineering, health physics and other radiation related fields.

Although nuclear power development is more significant in Alabama than in many other states, it must be noted that it is the country's eighth largest producer of coal. And, current energy development trends will make coal use an important factor in Alabama's energy future. To this end, the University of Alabama has been conducting research concerning coal gasification and liquifaction. Rust Engineering, a consultant firm, has applied for a grant to construct a coal gasification plant. Further, Alabama Power, with two reactors already on line and four more ordered, is also conducting research on the solvent refining of coal at its facilities in Wilsonville. The preceding represents areas of activity which may require state program personnel to carry out inspection and monitoring activities.

As in other fields of pollution control and abatement, the future trend seems to be one where the bulk of activities will filter finally to local and private authorities with the state performing monitoring and surveillance tasks. However, the problems of ensuring a quality environment for the state is complicated by the fact that the state cannot or is unwilling to assume responsibility for federally initiated and funded programs which are too frequently too expensive for state and local authorities to maintain on a long term basis.

In summation, the Alabama situation in energy portends active growth and development in both coal and nuclear areas. Related workforce growth will be a corollary of several factors: 1) Federal energy policy; 2) The level of federal funding assistance to state and local energy programs; 3) State energy commitments to energy activities. In any case, state officials anticipate only minimal growth. Most positions, and they will be for a cadre of highly trained professionals, supported by intensively trained technicians, will occur in the private and local/municipal sectors. Growing federal activity, i.e., TVA, will offer a number of similar positions. Engineers and scientists with backgrounds in energy related fields will find the most attractive positions.

Selected Post Secondary Institutions With Formal Environmental Energy Programs

The following pages provide detailed information regarding two environmental education programs in Alabama: the bachelor-level Civil Engineering program with environmental emphasis offered at the University of Southern Alabama and the Environmental Sciences Certificate program of the University of Alabama in Huntsville. Information concerning these offerings were supplied by professionals within these institutions. Data have also been extracted from college catalogs, and other available materials.

Additional environmental curricula are offered within the state at the bachelor, master and doctoral level. Auburn University's School of Engineering offers in its Chemical Engineering and Civil Engineering Departments courses in environmental and energy fields. These courses include: Nuclear Engineering, Industrial Waste Treatment, Health Physics, Water Supply and Disposal Systems, Air Quality Engineering and Water and Wastewater Treatment. In the Biology Department of Auburn University at Montgomery are two environmental options: the Environmental Studies Option and the Environmental Technology Option.

The Tuskeegee Institute offers a master's degree in Environmental Sciences in its School of Applied Sciences. Bachelor-level degrees in Mineral Engineering and Civil Engineering (with environmental coursework) are offered at the University of Alabama. This institution also offers master's degrees in Mineral Engineering and Environmental Engineering. The latter program makes use of environmental engineering courses and appropriate courses in biology, chemistry, geology and microbiology.

Courses are available in water supply, wastewater, air pollution, industrial waste and radiation. Alabama A & M University offers a B.S. degree in Environmental Science designed to prepare students for graduate study in environmental or related sciences and positions of technician level with governmental agencies and industries. Required courses include Ecology, Soil and Water Conservation, Air Pollution, Soil and Water Pollution and Soil, Plant and Water Analysis.

An Associate in Applied Science in Aquatic Technology is offered at the Southern Union State Junior College. This two-year program is designed for students seeking employment in agencies that are responsible for water environmental control. Included in the curriculum are courses that relate to bioassay techniques, water analysis, limnology, management of water impoundments, aquatic plants and fresh water fishes.

SENIOR INSTITUTIONS

University of Southern Alabama
Mobile, Alabama

Program: Civil Engineering (B.S.) (environmental emphasis)

Hours required for major: Quarter - Major 191; Minor 29.
Program Inception: 1967
Staff Size: Three professors, one associate professor, four instructors. (4 Ph.D.s, 4 M.S.)
Enrollment: 15 in civil engineering - 5 with environmental pollution option
Graduates (1976): 15 in civil engineering - 5 with environmental pollution option.
Placement: 14
Graduate work: 1

Courses (Undergraduate - Major)

Civil Engineering Orientation I
Civil Engineering Orientation II
Basic Engineering Surveying
Topographic Surveying
Route Surveying
Structural Mechanics I
Structural Mechanics II
Engineering Economics
Basic Soil Mechanics
Soil Mechanics
Fluid Mechanics and Hydraulics
Sanitary Analysis I
Water Supply and Wastewater Treatment
Structural Mechanics III
Structural Analysis
Structural Steel Design
Engineering Reports
Ethics and Jurisprudence
Construction Costs and Management
Construction Administration
Construction Materials
Advanced Soil Mechanics
Highway Engineering
Advanced Highway Engineering
Water Treatment
Hydrology
Sanitary Analysis II

Water Pollution Control
Air Pollution Control and Solid Waste Disposal I
Air Pollution Control and Solid Waste Disposal II
Pollution Control: Wastewater Treatment
Pollution Control: Industrial Waste Treatment
Reinforced Concrete Design
Foundations
Indeterminate Structures
Timber Engineering
Prestressed Concrete
Highway Bridges and Culverts
Independent Study

Courses (Undergraduate - Minor)

Sanitary Analysis I
Water and Wastewater
Water Treatment
Hydrology
Air Pollution Control I
Air Pollution Control II
Wastewater Treatment II

University of Alabama in Huntsville
Huntsville, Alabama

Program: Environmental Sciences Certificate (supplement to B.S., M.S., Ph.D.)

Hours required for certificate: Semester - 51
Program Inception: 1973
Staff Size: Two professors (Ph.D.'s), one associate professor, two lecturers (Ph.D.'s) and other faculty from School of Science and Engineering (all Ph.D.'s)
Enrollment: 5
Number of Certificates Issued: 0

Courses

Biology
Chemistry
Environmental Science
Physics
Statistics
Computer Science
Principles of Ecology
Environmental Climatology
Environmental Meteorology
Environmental Geology and Hydrology
Pollution Problems
Plant Ecology
Animal Ecology
Microbial Ecology
Limnology
Physiological Ecology
Marine Ecology
Marsh Ecology
Marine Geology
Environmental Chemistry
Environmental Engineering
Introduction to Human Engineering
Management Science
Systems Analysis
Selected Topics in Mechanical Engineering
Environmental Data Analysis

State Legislation

ALABAMA AIR

TITLE:

Air Pollution Control Act of 1971
Alabama Code, Act No. 769

PURPOSE:

To achieve and maintain levels of air quality to protect human health, and to coordinate state air pollution prevention and abatement programs.

DEFINITIONS:

1. Air pollution
2. Air contaminant
3. Commission
4. Person
5. Emission
6. Director

ADMINISTERING AUTHORITY:

Department of Public Health
Air Pollution Control Commission

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To establish ambient air quality standards;
To establish fuel and other emission standards;
To develop a comprehensive air pollution control plan;
To conduct studies regarding air pollution;
To administer grants and act as the state lead agency in air pollution matters;
To monitor air pollution in the state;
To approve construction of air pollution sources;
To enforce orders of Governor regarding air pollution;
To grant variances;
To control motor vehicle emissions.

PROHIBITED ACTS:

To allow or cause air pollution in violation of quality standards;
To violate or fail to obtain construction or operation permits;
To violate any regulation or provision of the act.

PENALTIES:

Civil - Fines of up to $10,000 and $10,000 per day;
Criminal - one year in jail.

ALABAMA PESTICIDES

TITLE:

Custom Application of Pesticides Act
Alabama Code, Act No. 1957

PURPOSE:

To regulate the application of pesticides in the public interest and to require the certification of pesticide applicators.

DEFINITIONS:

1. Active ingredient
2. Adulterated
3. Aircraft
4. Antidote
5. Bactericide
6. Board
7. Commissioner
8. Contamination
9. Custom application of pesticides
10. Defoliant
11. Desiccant
12. Device
13. Fungi
14. Fungicide
15. Ground equipment
16. Herbicide
17. Inert ingredient
18. Ingredient statement
19. Insect
20. Insecticide
21. Label
22. Labeling
23. Licensed pesticide dealer
24. Low volume
25. Misbranded
26. Nematocide
27. Nematode
28. Official sample
29. Person
30. Pesticide
31. Pesticide use permit
32. Plant regulator
33. Registrant
34. Restricted use pesticide
35. Rodenticide
36. Ultra low volume
37. Weed

ADMINISTERING AUTHORITY:

Board of Agriculture and Industries
Pesticide Advisory Committee

AUTHORIZATIONS:

To issue regulations pursuant to the act and pesticide usage;
To enter and inspect property in enforcement of the act;
To categorize and certify commercial applicators;
To regulate storage, transporation, labeling and disposal of pesticides.

CERTIFICATION OR LICENSING:

Commercial applicators in demonstration, agricultural, forest and right-of-way pest control must be certified; examination on knowledge required.

PROHIBITED ACTS:

To engage in custom application without license;
To handle or dispose of pesticides or containers in manner harmful to environment.

EXEMPTIONS:

Structural or household pest control;
Lawn, tree and shrub application;
Farmers on own land;
Local governmental units.

PENALTIES:

Fines of from $25 to $500 or six months imprisonment.

ALABAMA POTABLE WATER

TITLE:

Public Water Supply Systems and Waste Water Treatment Plants Law
Alabama Code, Act No. 1594

PURPOSE:

To protect the public health and water resources of the state through the certification of facility operators.

DEFINITIONS:

1. State health officer
2. Board
3. Certificate
4. Water supply system
5. Water treatment plant
6. Waste water treatment plant
7. Water distribution system
8. Operator
9. Trainee

ADMINISTERING AUTHORITY:

State Health Officer
Board of Certification

AUTHORIZATIONS:

To classify all water and waste water treatment plants and distribution systems;
To certify all facility operators;
To establish certification standards;
To issue regulations pursuant to the act.

CERTIFICATION OR LICENSING:

Operators must be certified at level corresponding to the facility; examination required except for prior operators.

PROHIBITED ACTS:

To operate a treatment or distribution facility without certified operator;
To perform operator duties without proper certification.

EXEMPTIONS:

Counties with population over 600,000.

PENALTIES:

Fines of up to $100 or 30 days in jail.

ALABAMA RADIATION

TITLE:

Radiation Control Act
Alabama Code, Act No. 582

PURPOSE:

To provide for a regulatory program of ionizing radiation sources, and to encourage the development of peaceful uses of ionizing radiation sources.

DEFINITIONS:

1. Byproduct material
2. Ionizing radiation
3. General license
4. Specific license
5. Person
6. Source material
7. Special nuclear material

ADMINISTERING AUTHORITY:

State Board of Health
Radiation Advisory Board

AUTHORIZATIONS:

To regulate, evaluate and control radiation materials;
To issue regulations pursuant to the act;
To cooperate with other state and federal agencies in radiation matters;
To conduct studies regarding ionizing radiation;
To issue licenses to those who use or possess various radiation sources and materials;
To enter and inspect property in enforcement of the act;
To require the maintenance of certain records.

PROHIBITED ACTS:

To use, manufacture, transport or possess any source of ionizing radiation without proper license;

To violate any regulation or provision of the act.

EXEMPTIONS:

Can be granted by Board from registration or licensing requirements.

PENALTIES:

Fines of up to $1,000 or one year in jail.

NRC AGREEMENT STATE: Yes

ALABAMA SOLID WASTE

TITLE:

Hazardous Wastes Management Act of 1976
Alabama Code

PURPOSE:

To provide for the regulation of transportation, treatment and disposal of hazardous wastes, other than radioactive wastes.

DEFINITIONS:

1. Board
2. Committee
3. Hazardous waste management
4. Hazardous wastes
5. Generator
6. Person
7. Waste
8. Transportation
9. Manifest
10. Trade secret
11. Storage
12. Treatment
13. Treatment facility
14. Disposal
15. Disposal site

ADMINISTERING AUTHORITY:

State Board of Health
Hazardous Waste Technical Advisory Committee

AUTHORIZATIONS:

To issue regulations regarding the transportation, treatment and disposal of hazardous wastes;
To acquire necessary disposal sites;
To supervise the operation of all hazardous waste disposal sites;
To issue permits for transportation and disposal of hazardous wastes.

PROHIBITED ACTS:

To fail to have a permit when engaged in transportation or disposal;
To dispose of hazardous wastes in violation of regulation or act provision;
To fail to identify and label all hazardous waste generated.

ALABAMA SOLID WASTE

TITLE:

Solid Wastes Disposal Act
Alabama Code, Act No. 771

PURPOSE:

To provide for the control and disposal of solid wastes and to authorize county and municipality action with regard to solid wastes.

DEFINITIONS:

1. Title
2. Solid wastes
3. Garbage
4. Ashes
5. Rubbish
6. Open dump
7. Unauthorized dump
8. Sanitary landfill
9. Landfill
10. Hazardous wastes
11. Hazardous wastes Incinerator
12. Composting/compost plant
13. Health department
14. Agency

ADMINISTERING AUTHORITY:

State Department of Health
Local Governmental Units

AUTHORIZATIONS:

To make solid waste collection and disposal facilities available;
To approve disposal sites and facilities;
To conduct necessary vector control activities;
To license private solid waste operations;
To generally enforce the act.

PROHIBITED ACTS:

To burn garbage or rubbish other than in approved incinerators;
To allow litter from hauling operations;
To use or allow unauthorized dumps;
To dispose of hazardous wastes with other solid waste.

EXEMPTIONS:

Certificates issued for household, business or industry disposal on own property.

PENALTIES:

Fines of from $5 to $100.

ALABAMA WASTE WATER

TITLE:

Water Improvement Commission Act
Alabama Code, Act No. 1260

PURPOSE:

To create a water improvement commission and provide for greater water pollution control.

DEFINITIONS:

1. Commission
2. Waters
3. Pollution
4. Sewerage
5. Industrial wastes
6. Other wastes
7. Person

ADMINISTERING AUTHORITY:

Water Improvement Commission

AUTHORIZATIONS:

To control water pollution in the state;
To conduct studies and investigations regarding water pollution;
To establish pollution standards;
To propose pollution abatement measures;
To require the maintenance of discharge records;
To administer water discharge permit program;
To issue pollution abatement orders;
To act as the state lead agency in water pollution matters.

PROHIBITED ACTS:

To allow or cause water pollution;
To violate the terms of any discharge permit;
To violate any regulation or act provision.

PENALTIES:

Fines of from $100 to $10,000;
Liability imposed for clean-up activity and fish and wildlife damage.